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PATENT & TRADEMARK OFFICE

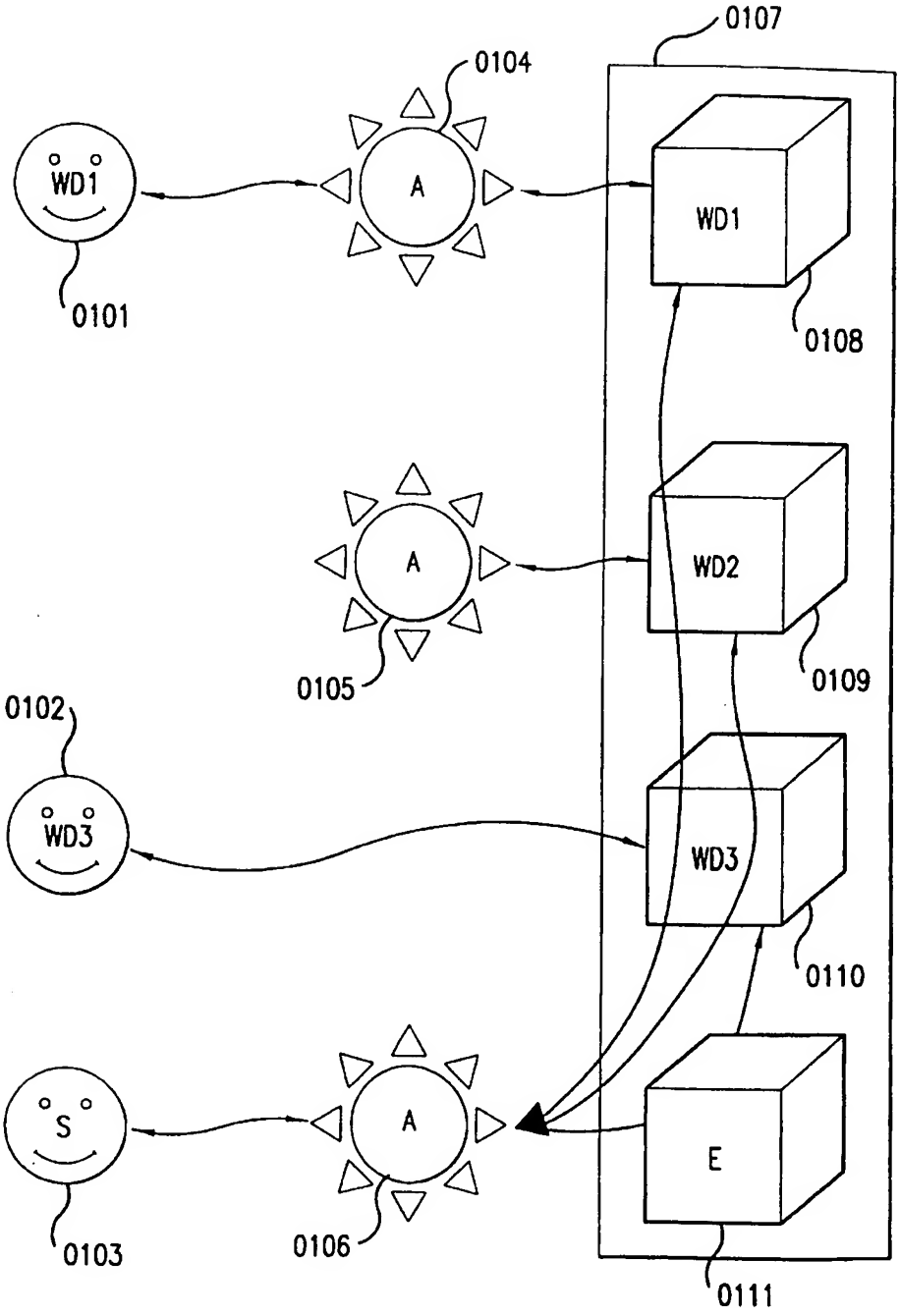


FIG.1

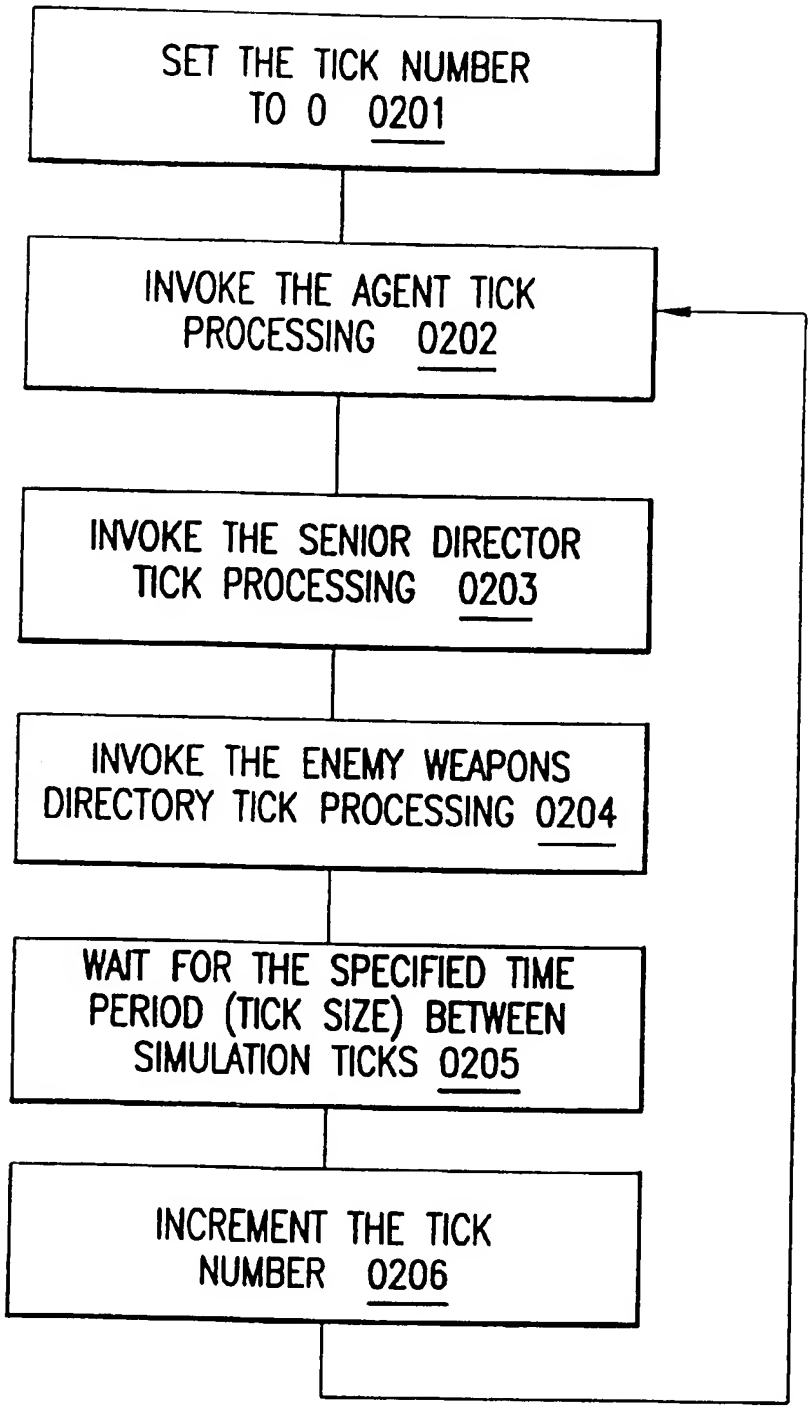

SET THE TICK NUMBER TO 0 0201
INVOKE THE AGENT TICK PROCESSING 0202
INVOKE THE SENIOR DIRECTOR TICK PROCESSING 0203
INVOKE THE ENEMY WEAPONS DIRECTORY TICK PROCESSING 0204
WAIT FOR THE SPECIFIED TIME PERIOD (TICK SIZE) BETWEEN SIMULATION TICKS 0205
INCREMENT THE TICK NUMBER 0206

FIG. 2

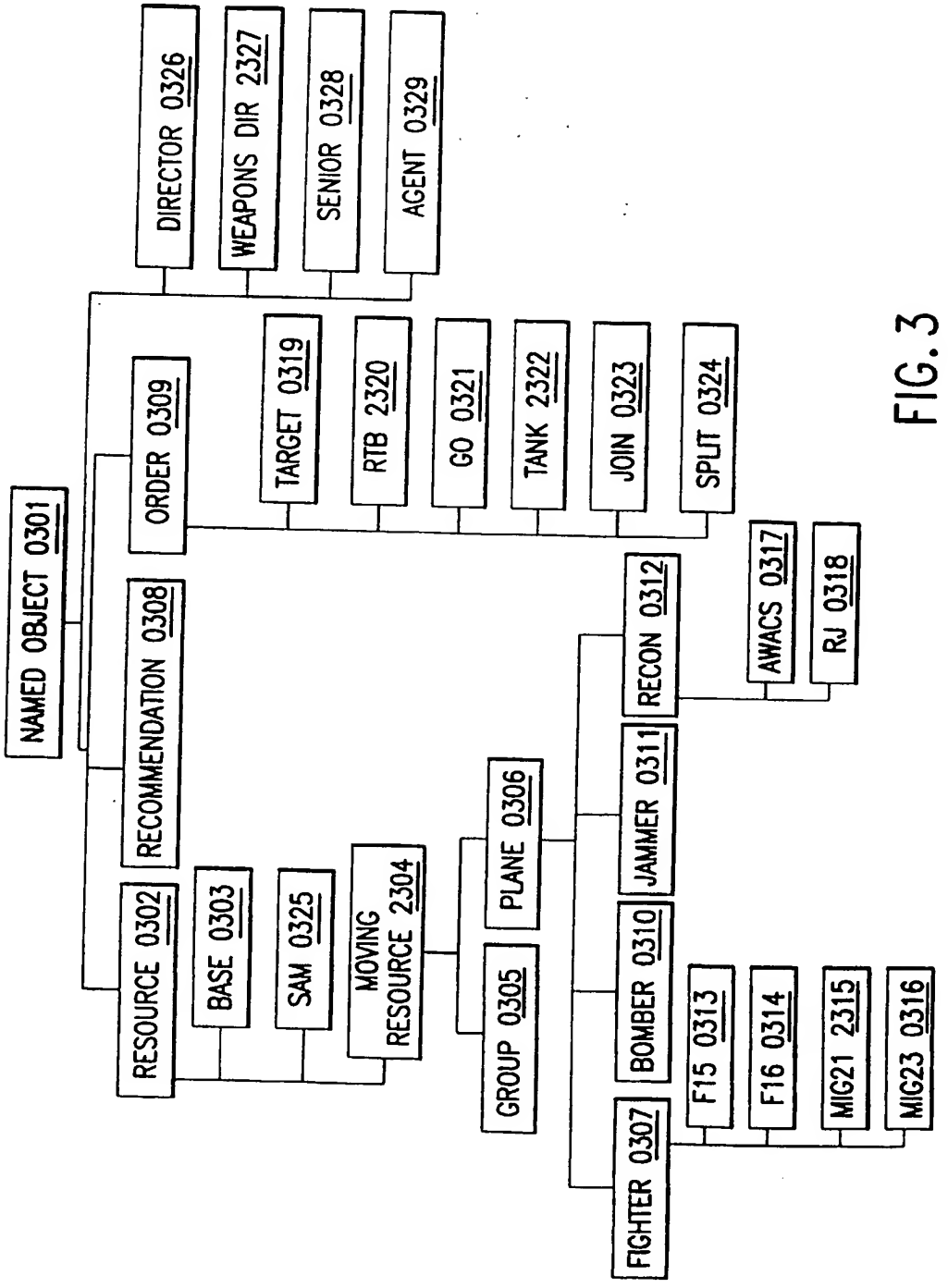

NAMED OBJECT 0301
ORDER 0309
DIRECTOR 0326
WEAPONS DIR 2327
SENIOR 0328
AGENT 0329
TARGET 0319
RTB 2320
GO 0321
TANK 2322
JOIN 0323
SPLIT 0324
RECOMMENDATION 0308
RESOURCE 0302
BASE 0303
SAM 0325
MOVING RESOURCE 2304
PLANE 0306
GROUP 0305
RECON 0312
AWACS 0317
RJ 0318
JAMMER 0311
BOMBER 0310
FIGHTER 0307
F15 0313
F16 0314
MIG21 2315
MIG23 0316

FIG. 3

REPLACEMENT SHEET

IDENTIFIER	TYPE	DESCRIPTION
NAME	STRING	NAME OF THE RESOURCE
XYZ	COORD	A TRIPLET OF FLOATING-POINT NUMBERS REPRESENTING 3-DIMENSIONAL COORDINATES OF THE RESOURCE
ALLEGIANCE	INTEGER	RESOURCE ALLEGIANCE: OURS, ENEMY OR UNKNOWN
RG	GROUP	RESOURCE GROUP TO WHICH THIS RESOURCE BELONGS (OR NULL)
WD	WEAPONSDIR	WEAPONS DIRECTORY TO WHICH THIS RESOURCE BELONGS
MUSTBEHANDLED	BOOLEAN	RESOURCE MUST BE HANDLED (EVENTUALLY)
CRITICAL	BOOLEAN	RESOURCE MUST BE HANDLED IMMEDIATELY
BEINGHANDLED	BOOLEAN	RESOURCE IS BEING HANDLED
COMMITTED	BOOLEAN	RESOURCE IS COMMITTED TO HANDLING
PENDING	BOOLEAN	RESOURCE IS PENDING COMMITMENT
RECALL	BOOLEAN	RESOURCE NO LONGER NEEDS TO BE HANDLED
DIRECTORHANDLING	DIRECTOR	WEAPONS DIRECTOR RESPONSIBLE FOR HANDLING THIS RESOURCE
ORDERS	ORDER	CURRENT ORDER OF THE RESOURCE
COMMITTEDTO	RESOURCE	REFERENCE TO A RESOURCE THIS RESOURCE IS COMMITTED TO HANDLING (OR NULL)
CANDIDATES	VECTOR	LIST OF CANDIDATES FOR THE RESOURCE-IF THIS IS OUR RESOURCE, THIS IS A LIST OF POTENTIAL ENEMY RESOURCES TO HANDLE, IF THIS IS AN ENEMY RESOURCE, THIS IS A LIST OF OUR RESOURCES THAT CAN POTENTIALLY HANDLE IT

FIG. 4

IDENTIFIER	TYPE	DESCRIPTION
MAXV	FLOAT	MAXIMUM POSSIBLE SPEED OF THE MOVING RESOURCE
CRUISEV	FLOAT	CRUISING SPEED OF THE MOVING RESOURCE
MINV	FLOAT	MINIMUM SPEED OF THE MOVING RESOURCE
CRUISEZ	FLOAT	CRUISING ALTITUDE OF THE MOVING RESOURCE
FUELCONSUMPTION	FLOAT	MOVING RESOURCE FUEL CONSUMPTION WHEN CRUISING
MAXFUEL	FLOAT	THE MAXIMUM AMOUNT OF FUEL THE MOVING RESOURCE CAN POSSESS
FUELREMAINING	FLOAT	THE REMAINING AMOUNT OF FUEL THE MOVING RESOURCE CAN POSSESS
XYP	COORD	THE PREVIOUS SET OF COORDINATES OF THE RESOURCE (FROM THE PREVIOUS TICK)
BASE	BASE	THE BASE THIS RESOURCE IS ASSIGNED TO (OR NULL)
DESTROYED	BOOLEAN	MOVING RESOURCE DESTRUCTION INDICATOR
ATBASE	BOOLEAN	MOVING RESOURCE LANDING AT BASE INDICATOR
GETTINGFUEL	BOOLEAN	MOVING RESOURCE FUELING IN PROGRESS INDICATOR

FIG. 5

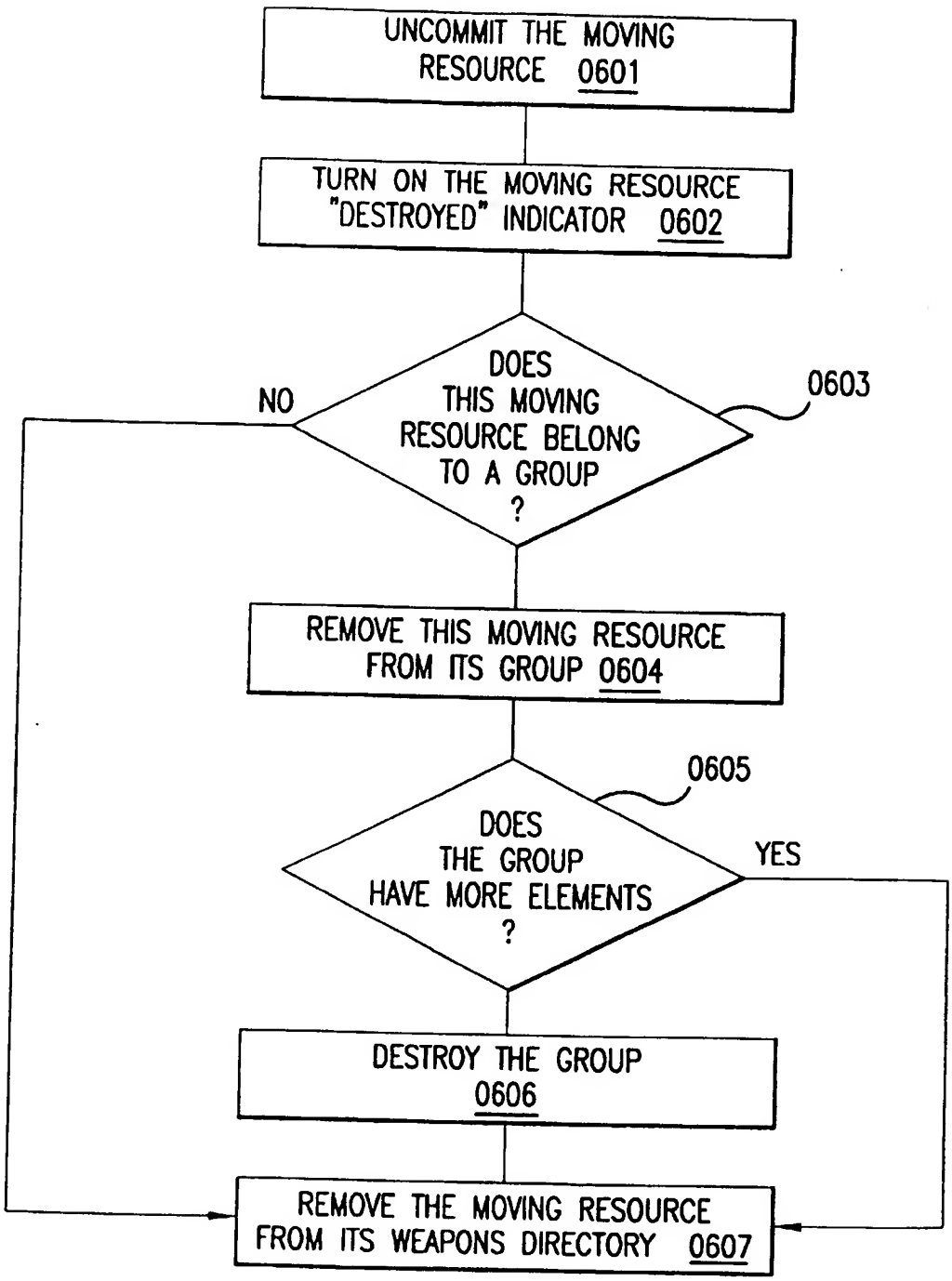

UNCOMMIT THE MOVING RESOURCE 0601
TURN ON THE MOVING RESOURCE "DESTROYED" INDICATOR 0602
DOES THIS MOVING RESOURCE BELONG TO A GROUP ?
0603
NO
REMOVE THIS MOVING RESOURCE FROM ITS GROUP 0604
DOES THE GROUP HAVE MORE ELEMENTS ?
0605
YES
DESTROY THE GROUP 0606
REMOVE THE MOVING RESOURCE FROM ITS WEAPONS DIRECTORY 0607

FIG. 6

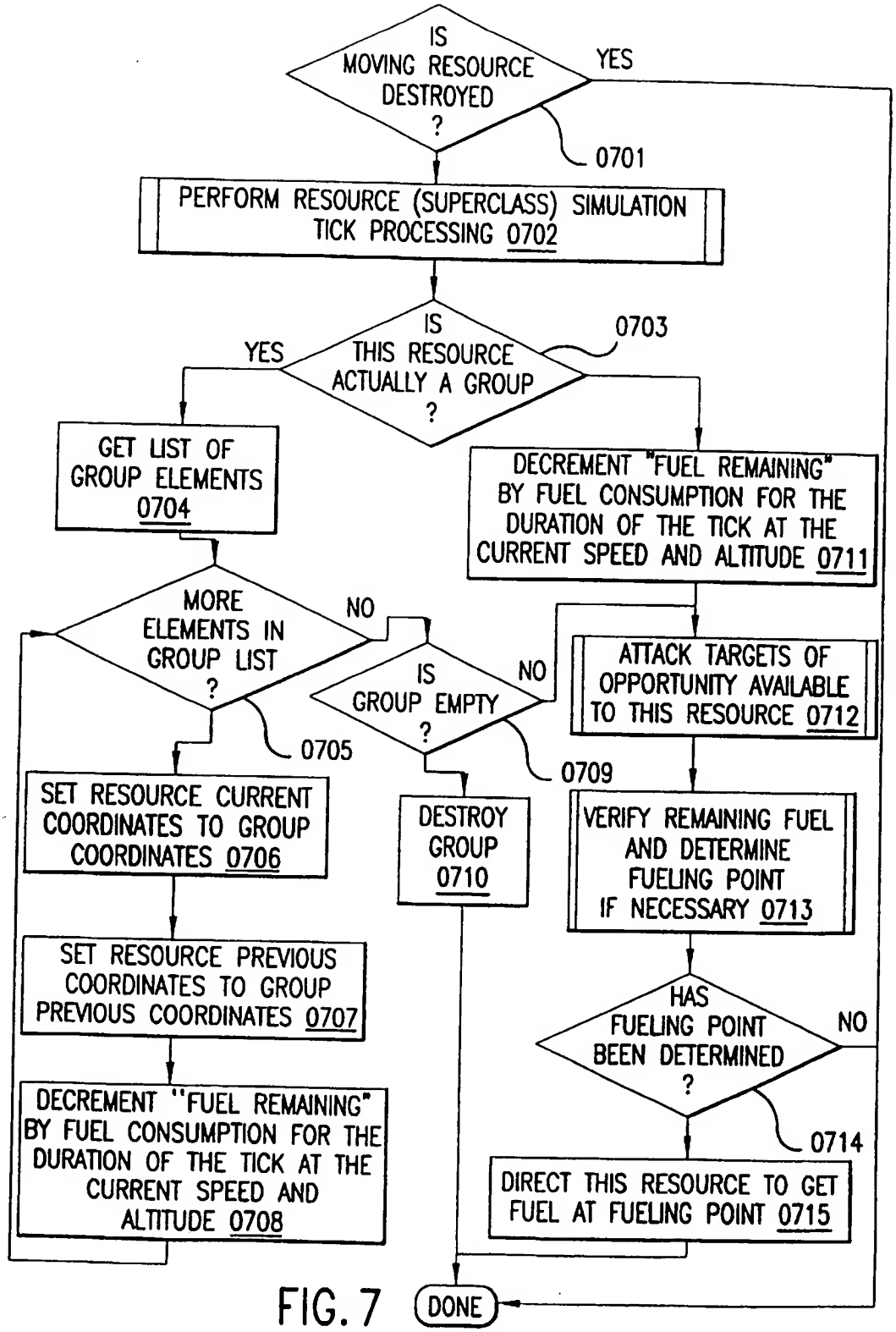

IS MOVING RESOURCE DESTROYED ?
YES
0701
PERFORM RESOURCE (SUPERCLASS) SIMULATION TICK PROCESSING 0702
IS THIS RESOURCE ACTUALLY A GROUP ?
0703
YES
GET LIST OF GROUP ELEMENTS 0704
DECREMENT "FUEL REMAINING" BY FUEL CONSUMPTION FOR THE DURATION OF THE TICK AT THE CURRENT SPEED AND ALTITUDE 0711
MORE ELEMENTS IN GROUP LIST ?
NO
0705
IS GROUP EMPTY ?
NO
0709
ATTACK TARGETS OF OPPORTUNITY AVAILABLE TO THIS RESOURCE 0712
SET RESOURCE CURRENT COORDINATES TO GROUP COORDINATES 0706
DESTROY GROUP 0710
VERIFY REMAINING FUEL AND DETERMINE FUELING POINT IF NECESSARY 0713
SET RESOURCE PREVIOUS COORDINATES TO GROUP PREVIOUS COORDINATES 0707
HAS FUELING POINT BEEN DETERMINED ?
NO
DECREMENT "FUEL REMAINING" BY FUEL CONSUMPTION FOR THE DURATION OF THE TICK AT THE CURRENT SPEED AND ALTITUDE 0708
0714
DIRECT THIS RESOURCE TO GET FUEL AT FUELING POINT 0715
DONE

FIG. 7

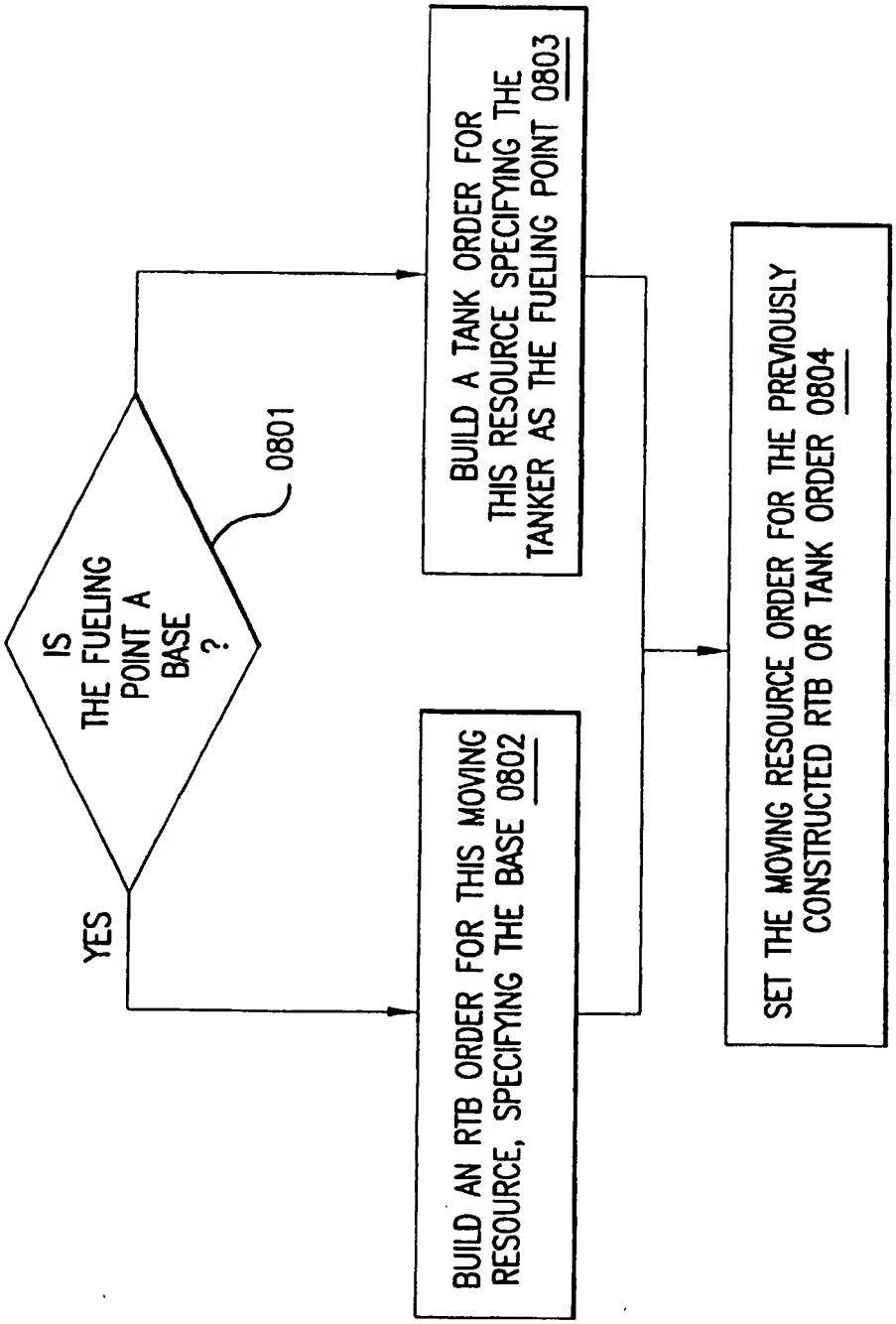

IS THE FUELING POINT A BASE ?
0801
YES
BUILD A TANK ORDER FOR THIS RESOURCE SPECIFYING THE TANKER AS THE FUELING POINT 0803
BUILD AN RTB ORDER FOR THIS MOVING RESOURCE, SPECIFYING THE BASE 0802
SET THE MOVING RESOURCE ORDER FOR THE PREVIOUSLY CONSTRUCTED RTB OR TANK ORDER 0804

FIG. 8

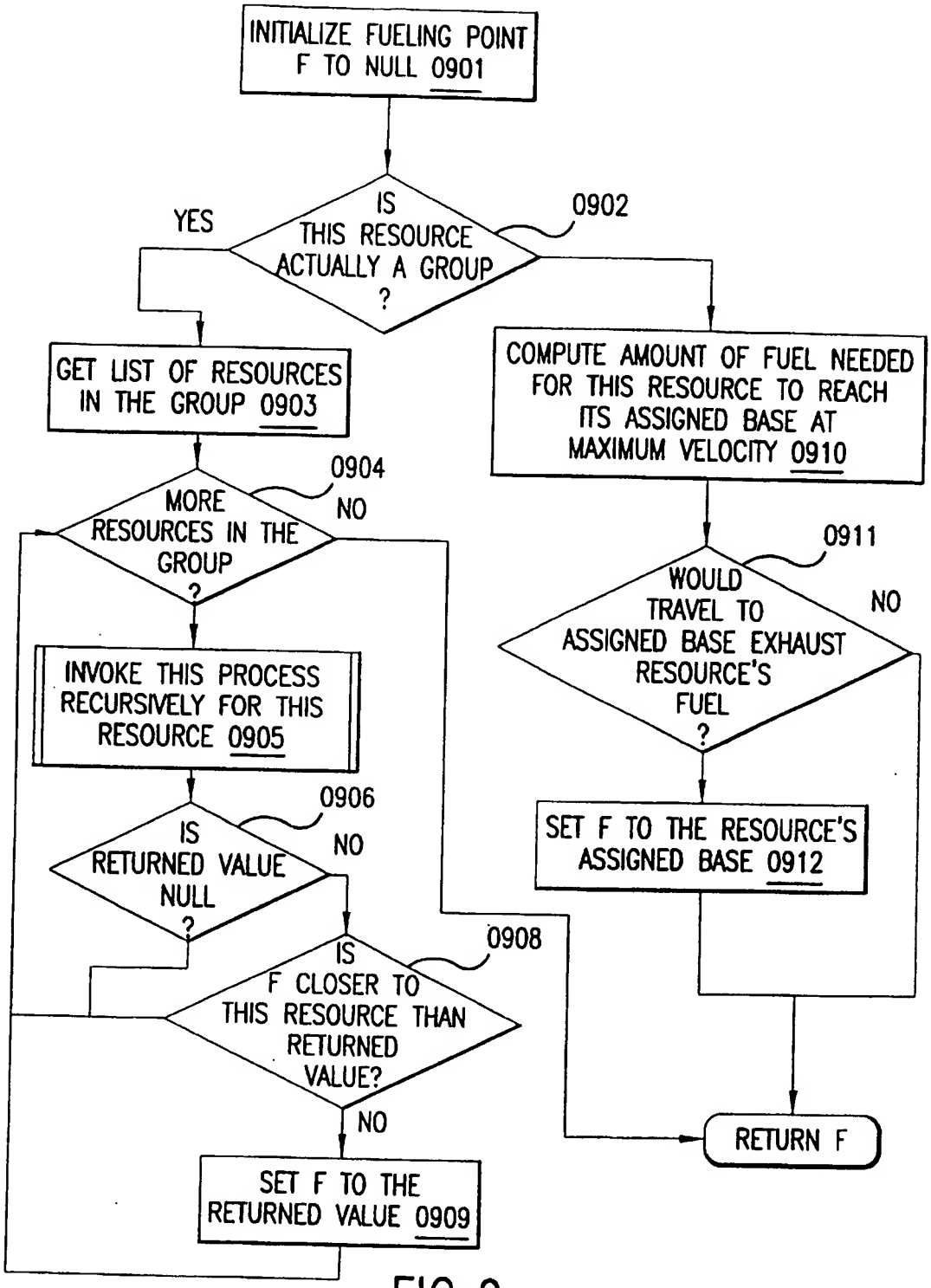

INITIALIZE FUELING POINT F TO NULL 0901
IS THIS RESOURCE ACTUALLY A GROUP ?
0902
YES
GET LIST OF RESOURCES IN THE GROUP 0903
MORE RESOURCES IN THE GROUP ?
0904
NO
INVOKE THIS PROCESS RECURSIVELY FOR THIS RESOURCE 0905
IS RETURNED VALUE NULL ?
0906
NO
IS F CLOSER TO THIS RESOURCE THAN RETURNED VALUE?
0908
NO
SET F TO THE RETURNED VALUE 0909
COMPUTE AMOUNT OF FUEL NEEDED FOR THIS RESOURCE TO REACH ITS ASSIGNED BASE AT MAXIMUM VELOCITY 0910
WOULD TRAVEL TO ASSIGNED BASE EXHAUST RESOURCE'S FUEL ?
0911
NO
SET F TO THE RESOURCE'S ASSIGNED BASE 0912
RETURN F

FIG. 9

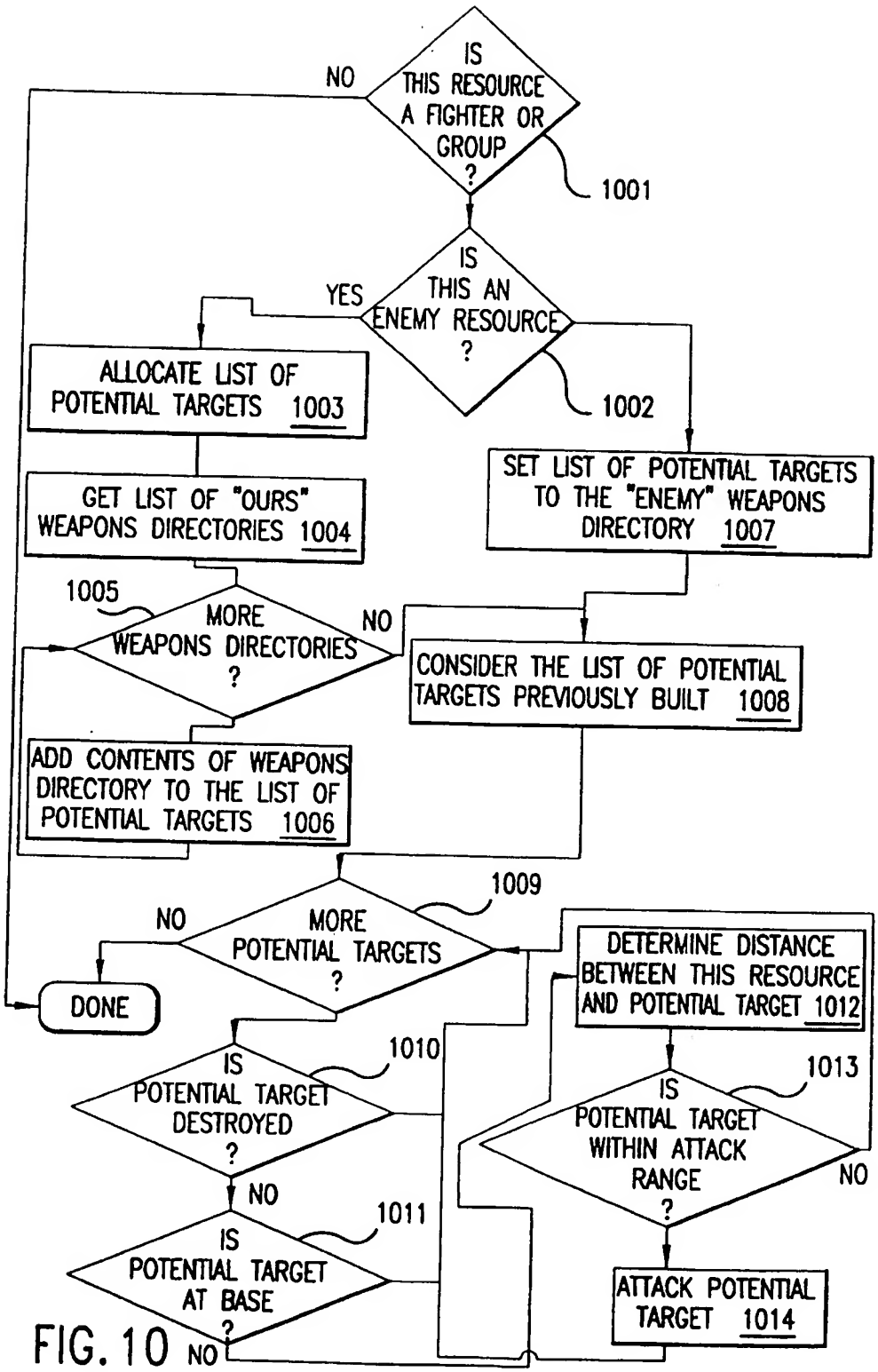
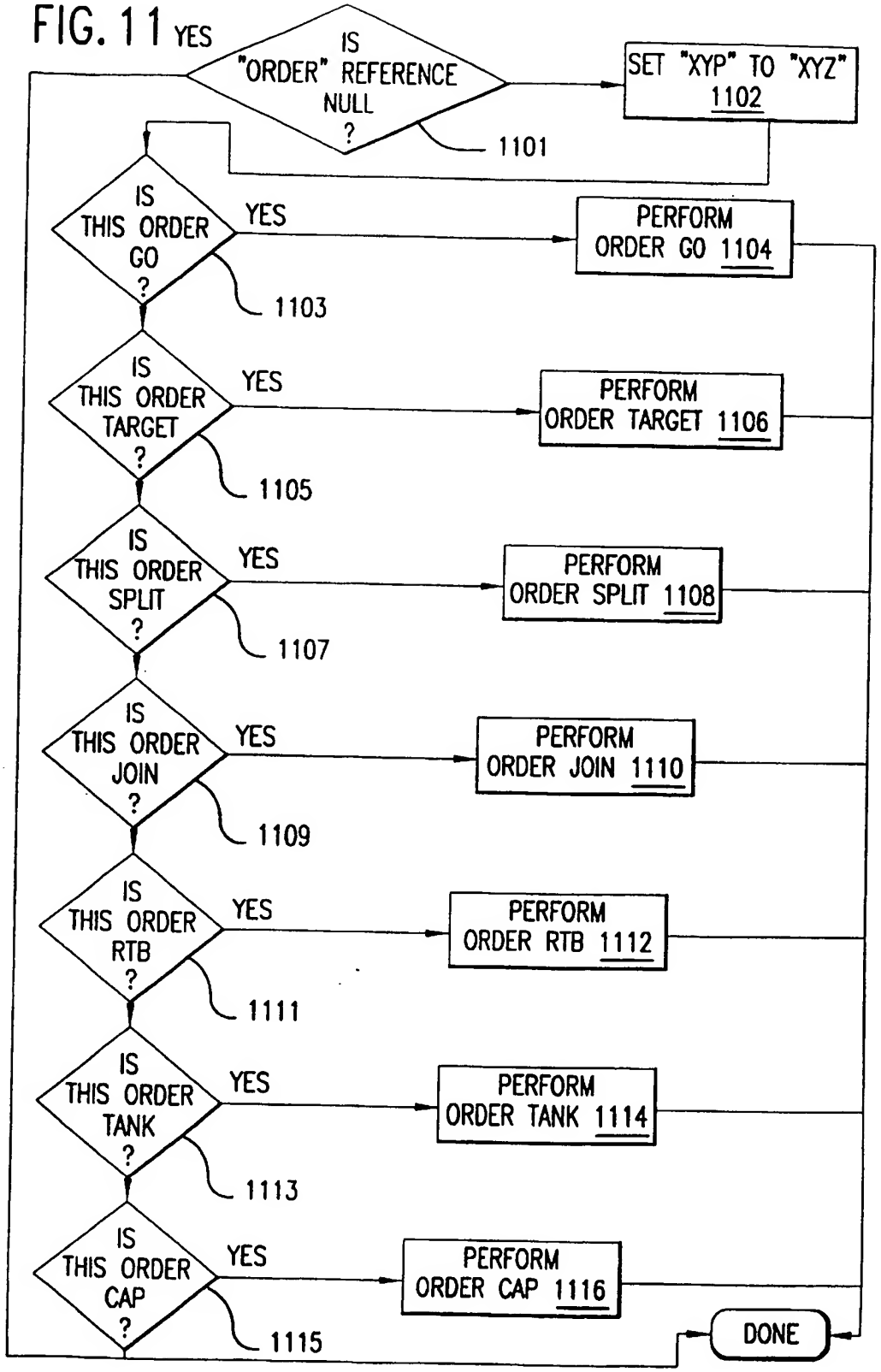

IS THIS RESOURCE A FIGHTER OR GROUP ?
1001
NO
IS THIS AN ENEMY RESOURCE ?
1002
YES
ALLOCATE LIST OF POTENTIAL TARGETS 1003
GET LIST OF "OURS" WEAPONS DIRECTORIES 1004
SET LIST OF POTENTIAL TARGETS TO THE "ENEMY" WEAPONS DIRECTORY 1007
1005
MORE WEAPONS DIRECTORIES ?
NO
CONSIDER THE LIST OF POTENTIAL TARGETS PREVIOUSLY BUILT 1008
ADD CONTENTS OF WEAPONS DIRECTORY TO THE LIST OF POTENTIAL TARGETS 1006
1009
MORE POTENTIAL TARGETS ?
NO
DONE
DETERMINE DISTANCE BETWEEN THIS RESOURCE AND POTENTIAL TARGET 1012
1010
IS POTENTIAL TARGET DESTROYED ?
1013
IS POTENTIAL TARGET WITHIN ATTACK RANGE ?
NO
NO
1011
IS POTENTIAL TARGET AT BASE ?
ATTACK POTENTIAL TARGET 1014
NO

FIG. 10

FIG. 11


IS "ORDER" REFERENCE NULL ?
YES
1101
SET "XYP" TO "XYZ" 1102
IS THIS ORDER GO ?
YES
1103
PERFORM ORDER GO 1104
IS THIS ORDER TARGET ?
YES
1105
PERFORM ORDER TARGET 1106
IS THIS ORDER SPLIT ?
YES
1107
PERFORM ORDER SPLIT 1108
IS THIS ORDER JOIN ?
YES
1109
PERFORM ORDER JOIN 1110
IS THIS ORDER RTB ?
YES
1111
PERFORM ORDER RTB 1112
IS THIS ORDER TANK ?
YES
1113
PERFORM ORDER TANK 1114
IS THIS ORDER CAP ?
YES
1115
PERFORM ORDER CAP 1116
DONE

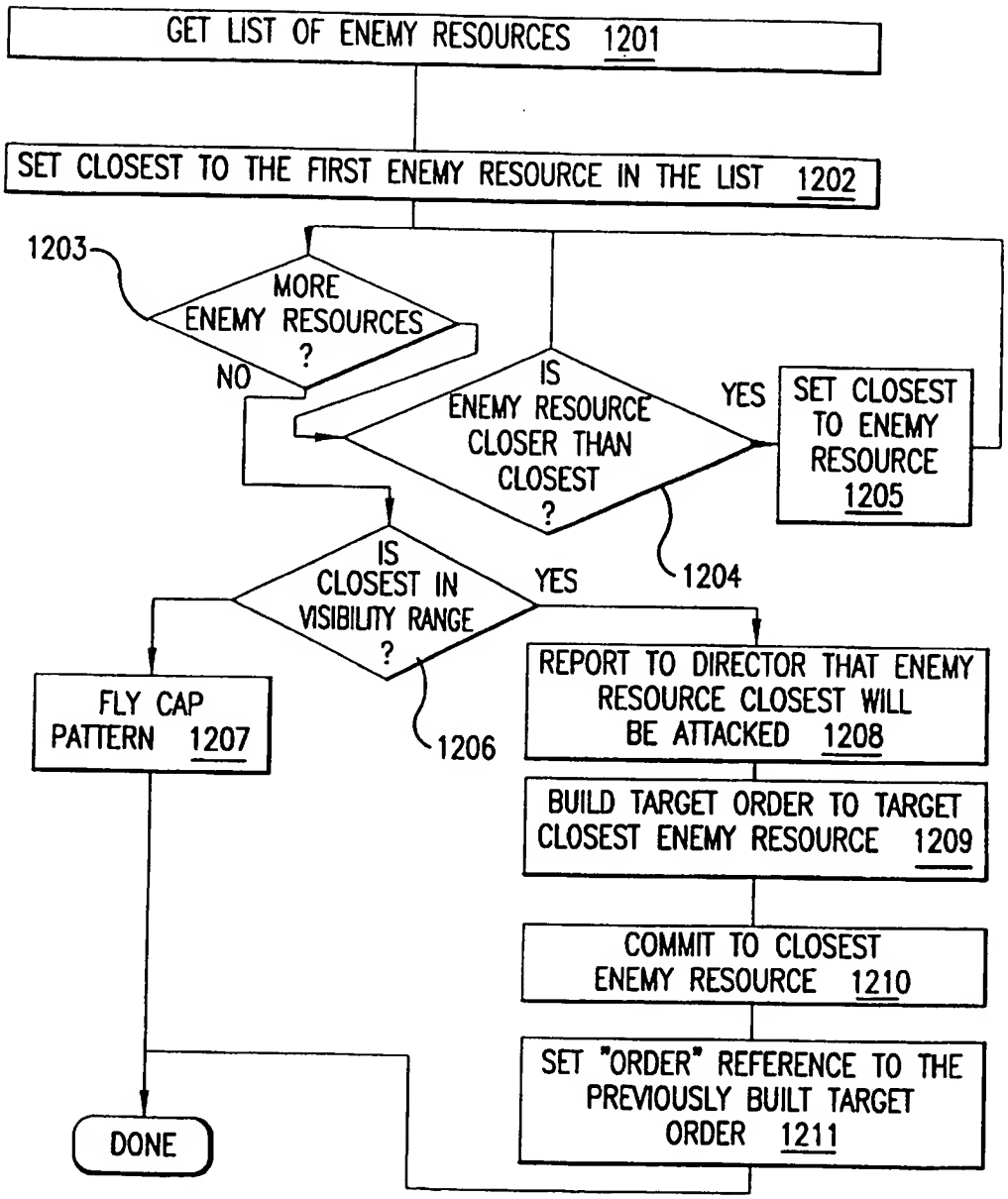

GET LIST OF ENEMY RESOURCES 1201
SET CLOSEST TO THE FIRST ENEMY RESOURCE IN THE LIST 1202
1203
MORE ENEMY RESOURCES ?
NO
IS ENEMY RESOURCE CLOSER THAN CLOSEST ?
YES
SET CLOSEST TO ENEMY RESOURCE 1205
1204
IS CLOSEST IN VISIBILITY RANGE ?
YES
1206
FLY CAP PATTERN 1207
REPORT TO DIRECTOR THAT ENEMY RESOURCE CLOSEST WILL BE ATTACKED 1208
BUILD TARGET ORDER TO TARGET CLOSEST ENEMY RESOURCE 1209
COMMIT TO CLOSEST ENEMY RESOURCE 1210
SET "ORDER" REFERENCE TO THE PREVIOUSLY BUILT TARGET ORDER 1211
DONE

FIG. 12

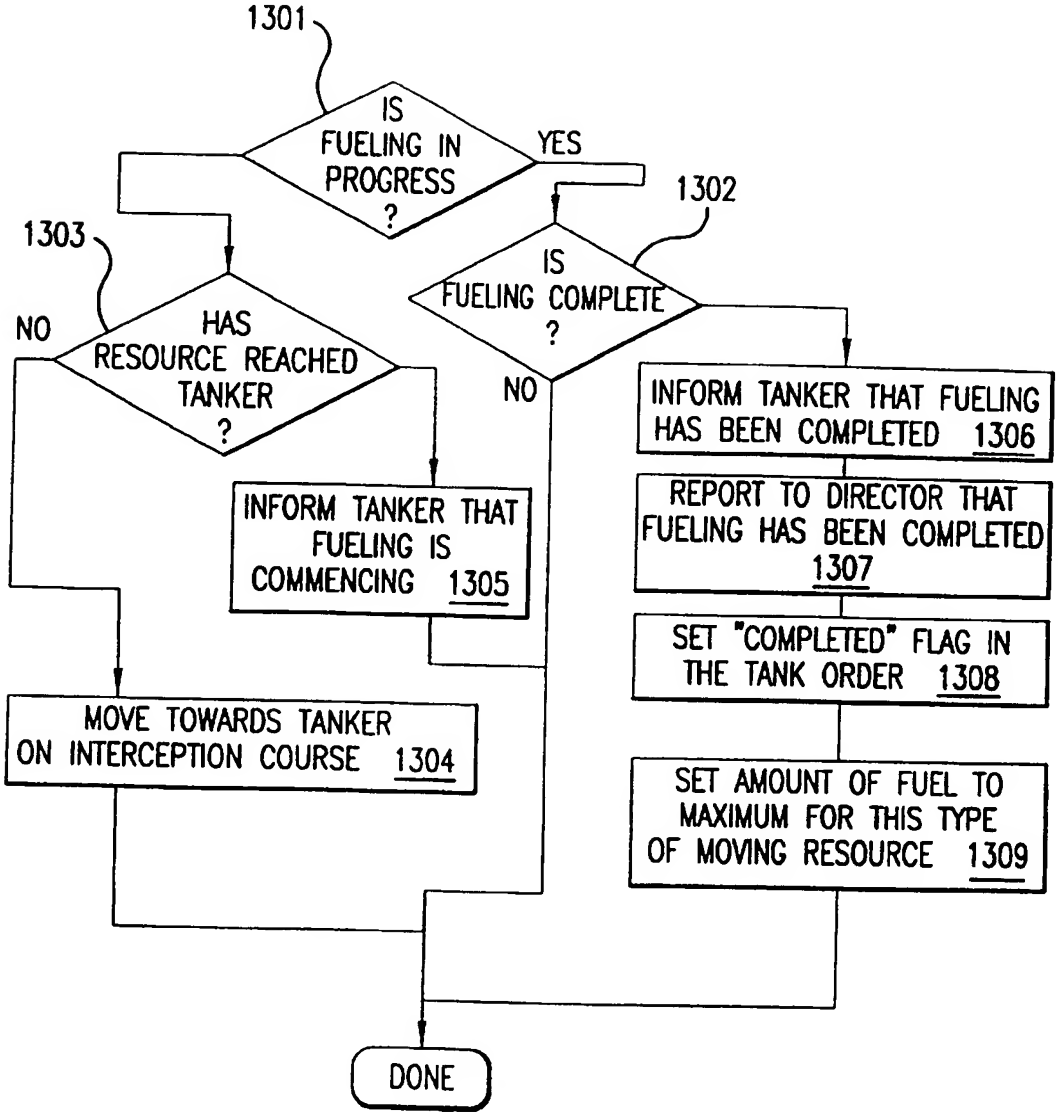

1301
IS FUELING IN PROGRESS ?
YES
1302
IS FUELING COMPLETE ?
1303
NO
HAS RESOURCE REACHED TANKER ?
NO
INFORM TANKER THAT FUELING IS COMMENCING 1305
INFORM TANKER THAT FUELING HAS BEEN COMPLETED 1306
REPORT TO DIRECTOR THAT FUELING HAS BEEN COMPLETED 1307
SET "COMPLETED" FLAG IN THE TANK ORDER 1308
MOVE TOWARDS TANKER ON INTERCEPTION COURSE 1304
SET AMOUNT OF FUEL TO MAXIMUM FOR THIS TYPE OF MOVING RESOURCE 1309
DONE

FIG. 13

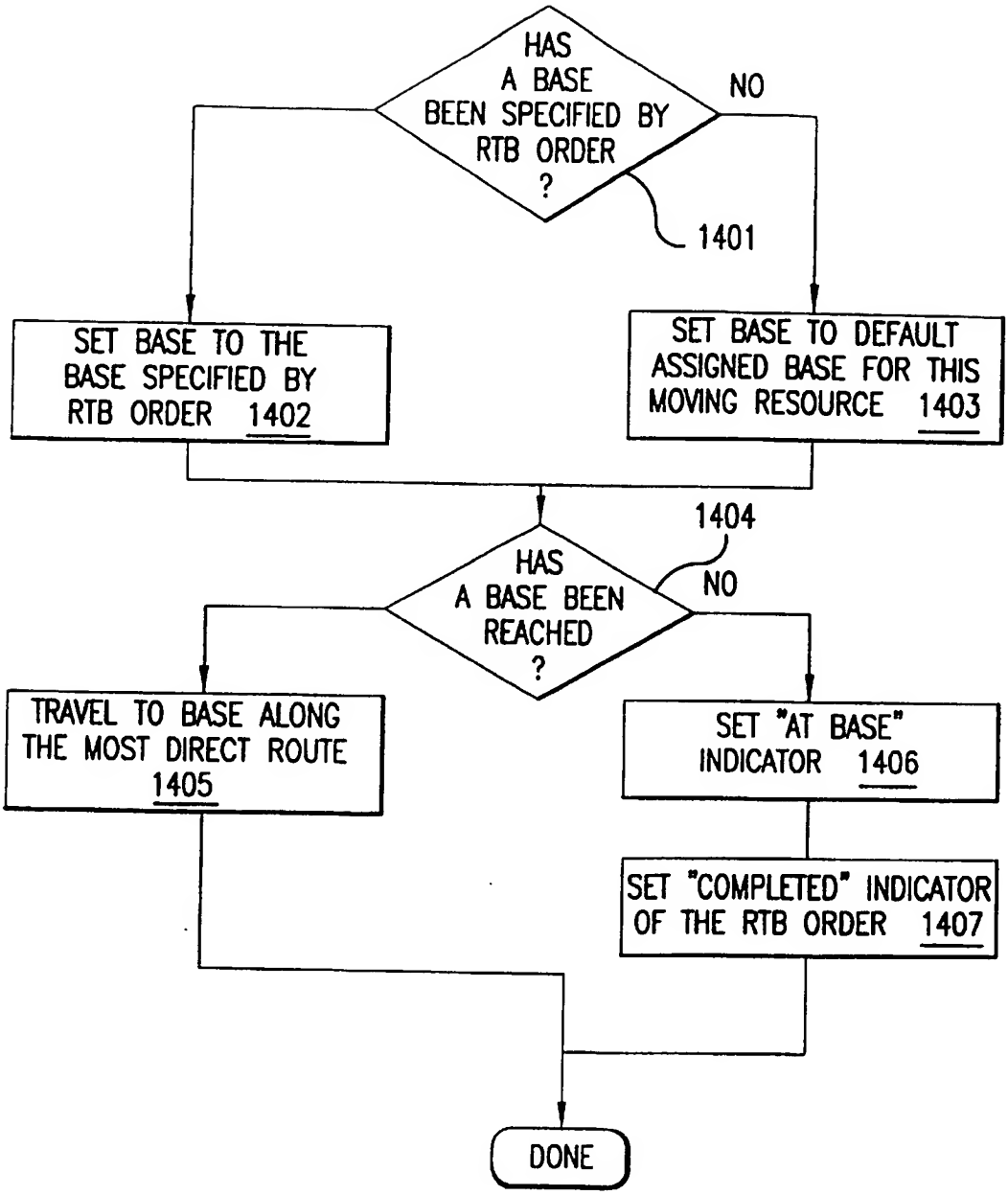

HAS A BASE BEEN SPECIFIED BY RTB ORDER ?
NO
1401
SET BASE TO THE BASE SPECIFIED BY RTB ORDER 1402
SET BASE TO DEFAULT ASSIGNED BASE FOR THIS MOVING RESOURCE 1403
1404
HAS A BASE BEEN REACHED ?
NO
TRAVEL TO BASE ALONG THE MOST DIRECT ROUTE 1405
SET "AT BASE" INDICATOR 1406
SET "COMPLETED" INDICATOR OF THE RTB ORDER 1407
DONE

FIG. 14

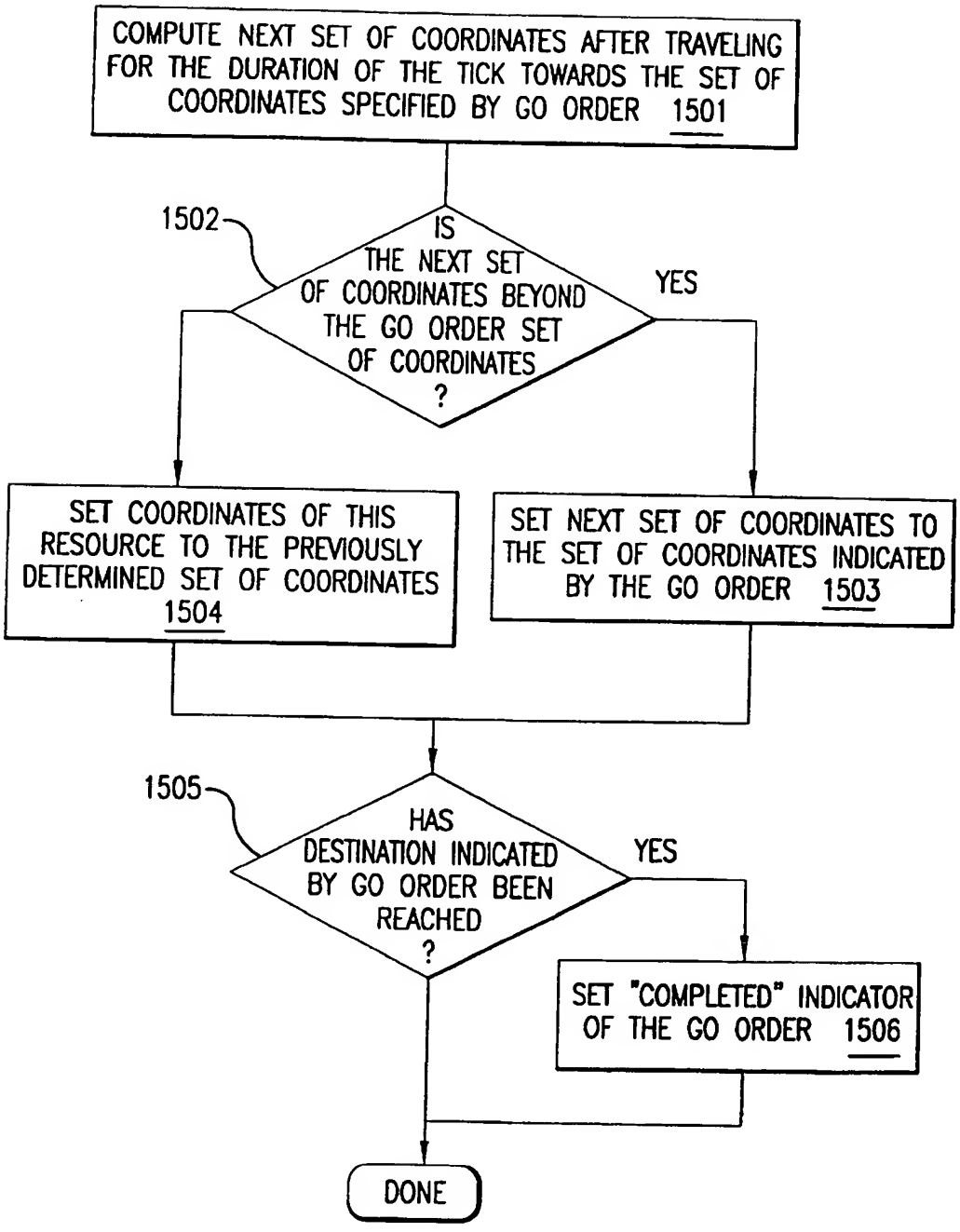

COMPUTE NEXT SET OF COORDINATES AFTER TRAVELING FOR THE DURATION OF THE TICK TOWARDS THE SET OF COORDINATES SPECIFIED BY GO ORDER 1501
1502
IS THE NEXT SET OF COORDINATES BEYOND THE GO ORDER SET OF COORDINATES ?
YES
SET COORDINATES OF THIS RESOURCE TO THE PREVIOUSLY DETERMINED SET OF COORDINATES 1504
SET NEXT SET OF COORDINATES TO THE SET OF COORDINATES INDICATED BY THE GO ORDER 1503
1505
HAS DESTINATION INDICATED BY GO ORDER BEEN REACHED ?
YES
SET "COMPLETED" INDICATOR OF THE GO ORDER 1506
DONE

FIG. 15

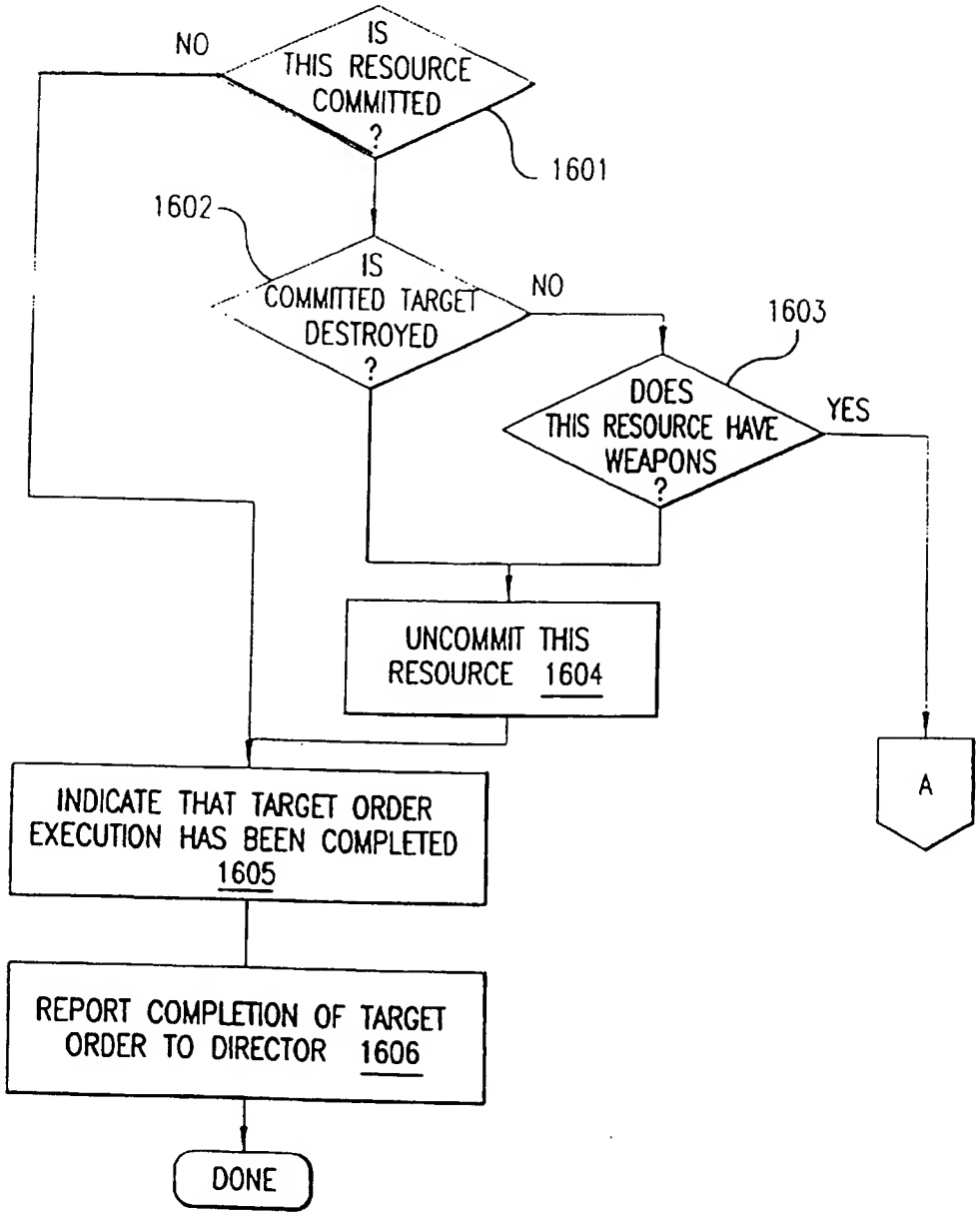

IS THIS RESOURCE COMMITTED ?
NO
1601
1602
IS COMMITTED TARGET DESTROYED ?
NO
1603
DOES THIS RESOURCE HAVE WEAPONS ?
YES
UNCOMMIT THIS RESOURCE 1604
A
INDICATE THAT TARGET ORDER EXECUTION HAS BEEN COMPLETED 1605
REPORT COMPLETION OF TARGET ORDER TO DIRECTOR 1606
DONE

FIG.16 A

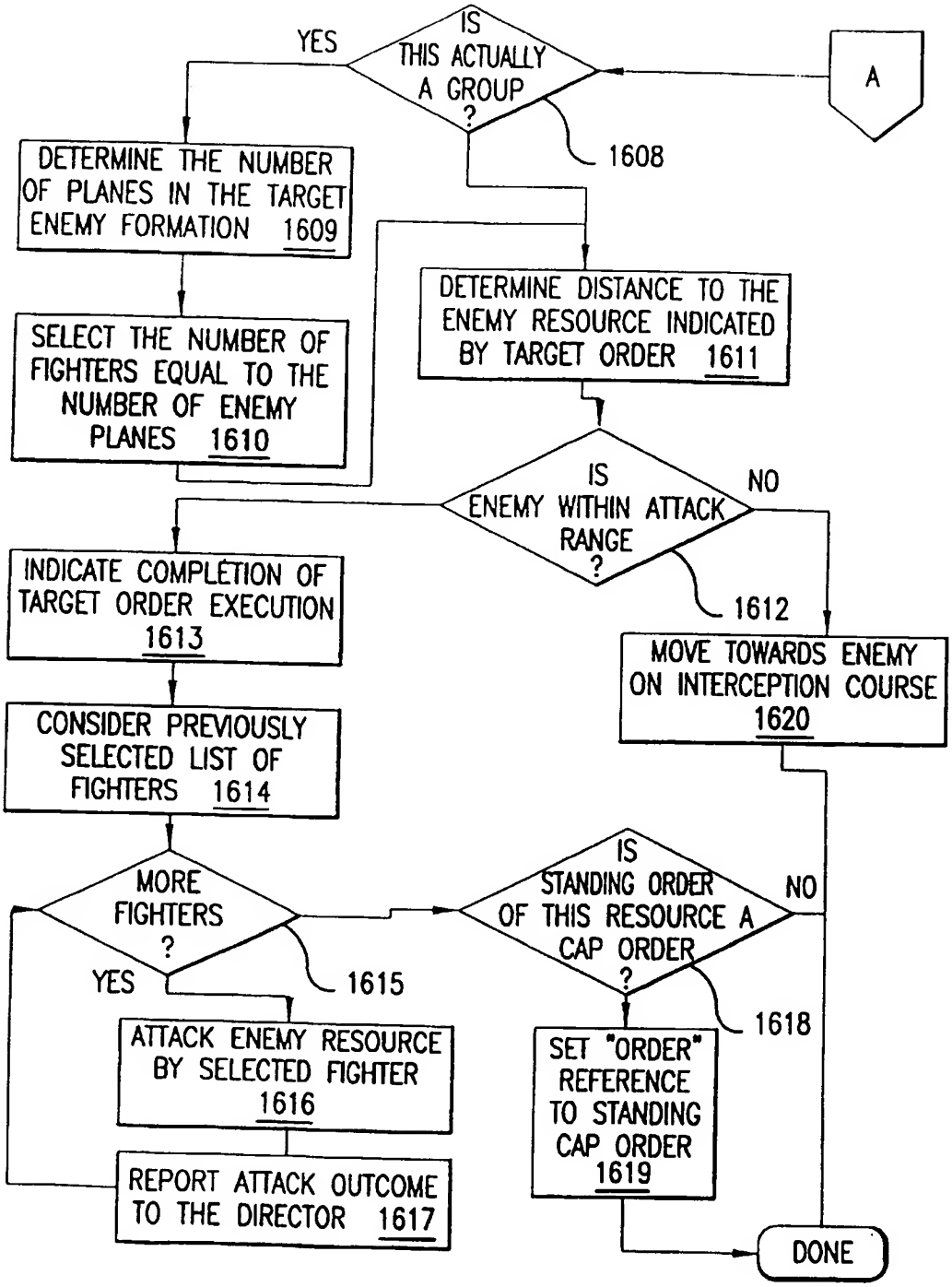

IS THIS ACTUALLY A GROUP ?
YES
1608
A
DETERMINE THE NUMBER OF PLANES IN THE TARGET ENEMY FORMATION 1609
SELECT THE NUMBER OF FIGHTERS EQUAL TO THE NUMBER OF ENEMY PLANES 1610
DETERMINE DISTANCE TO THE ENEMY RESOURCE INDICATED BY TARGET ORDER 1611
IS ENEMY WITHIN ATTACK RANGE ?
NO
1612
INDICATE COMPLETION OF TARGET ORDER EXECUTION 1613
MOVE TOWARDS ENEMY ON INTERCEPTION COURSE 1620
CONSIDER PREVIOUSLY SELECTED LIST OF FIGHTERS 1614
MORE FIGHTERS ?
YES
1615
IS STANDING ORDER OF THIS RESOURCE A CAP ORDER ?
NO
1618
ATTACK ENEMY RESOURCE BY SELECTED FIGHTER 1616
REPORT ATTACK OUTCOME TO THE DIRECTOR 1617
SET "ORDER" REFERENCE TO STANDING CAP ORDER 1619
DONE

FIG.16B

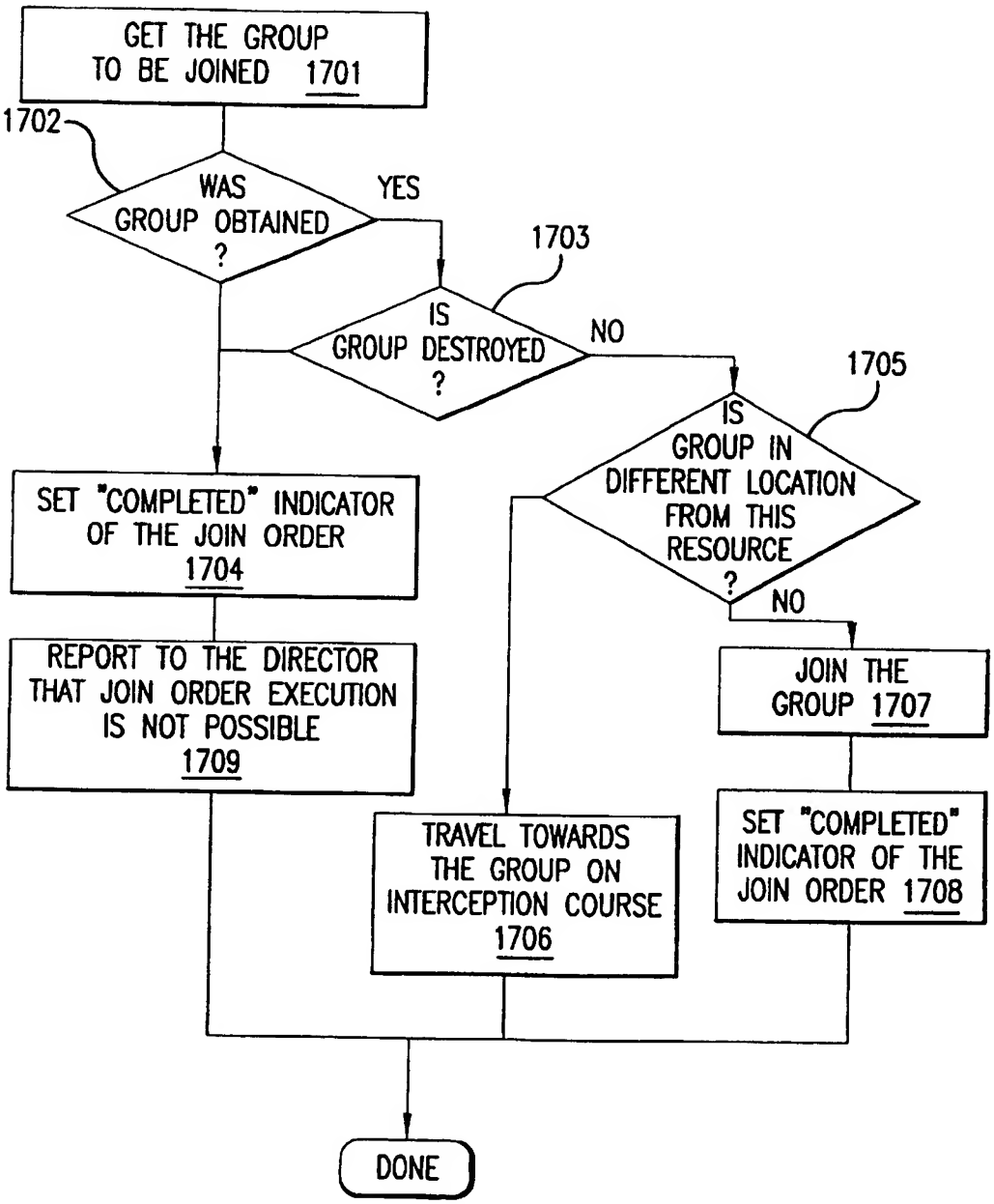

GET THE GROUP TO BE JOINED 1701
1702
WAS GROUP OBTAINED ?
YES
1703
IS GROUP DESTROYED ?
NO
1705
IS GROUP IN DIFFERENT LOCATION FROM THIS RESOURCE ?
NO
SET "COMPLETED" INDICATOR OF THE JOIN ORDER 1704
REPORT TO THE DIRECTOR THAT JOIN ORDER EXECUTION IS NOT POSSIBLE 1709
JOIN THE GROUP 1707
TRAVEL TOWARDS THE GROUP ON INTERCEPTION COURSE 1706
SET "COMPLETED" INDICATOR OF THE JOIN ORDER 1708
DONE

FIG. 17

IDENTIFIER	TYPE	DESCRIPTION
MAXZ	FLOAT	MAXIMUM POSSIBLE ALTITUDE FOR THIS PLANE
MAXL	FLOAT	MAXIMUM POSSIBLE TRAVEL RANGE FOR THIS PLANE
HIT	BOOLEAN	A PLANE HAS BEEN HIT (BY A MISSILE) INDICATOR
MECHANICALPROBLEM	BOOLEAN	A PLANE HAS DEVELOPED A MECHANICAL PROBLEM

FIG. 18

IDENTIFIER	TYPE	DESCRIPTION
WEAPONS	WEAPONS	REFERENCE TO A FIGHTER WEAPONS DESCRIPTOR
NUMATTACKS	INTEGER	NUMBER OF ATTACKS THIS FIGHTER HAS PERFORMED

FIG. 19

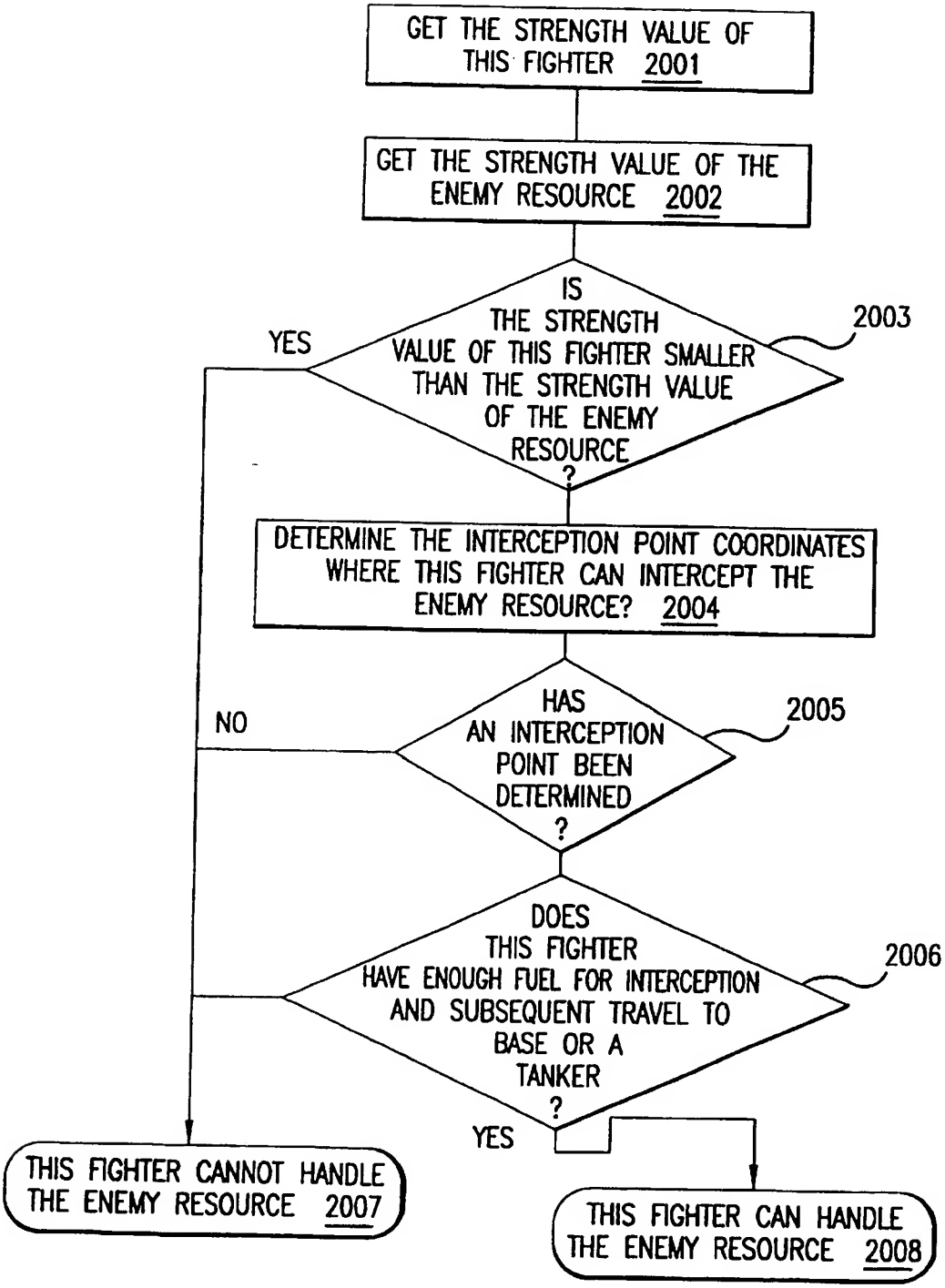

GET THE STRENGTH VALUE OF THIS FIGHTER 2001
GET THE STRENGTH VALUE OF THE ENEMY RESOURCE 2002
IS THE STRENGTH VALUE OF THIS FIGHTER SMALLER THAN THE STRENGTH VALUE OF THE ENEMY RESOURCE ?
2003
YES
DETERMINE THE INTERCEPTION POINT COORDINATES WHERE THIS FIGHTER CAN INTERCEPT THE ENEMY RESOURCE? 2004
HAS AN INTERCEPTION POINT BEEN DETERMINED ?
2005
NO
DOES THIS FIGHTER HAVE ENOUGH FUEL FOR INTERCEPTION AND SUBSEQUENT TRAVEL TO BASE OR A TANKER ?
2006
YES
THIS FIGHTER CANNOT HANDLE THE ENEMY RESOURCE 2007
THIS FIGHTER CAN HANDLE THE ENEMY RESOURCE 2008

FIG. 20

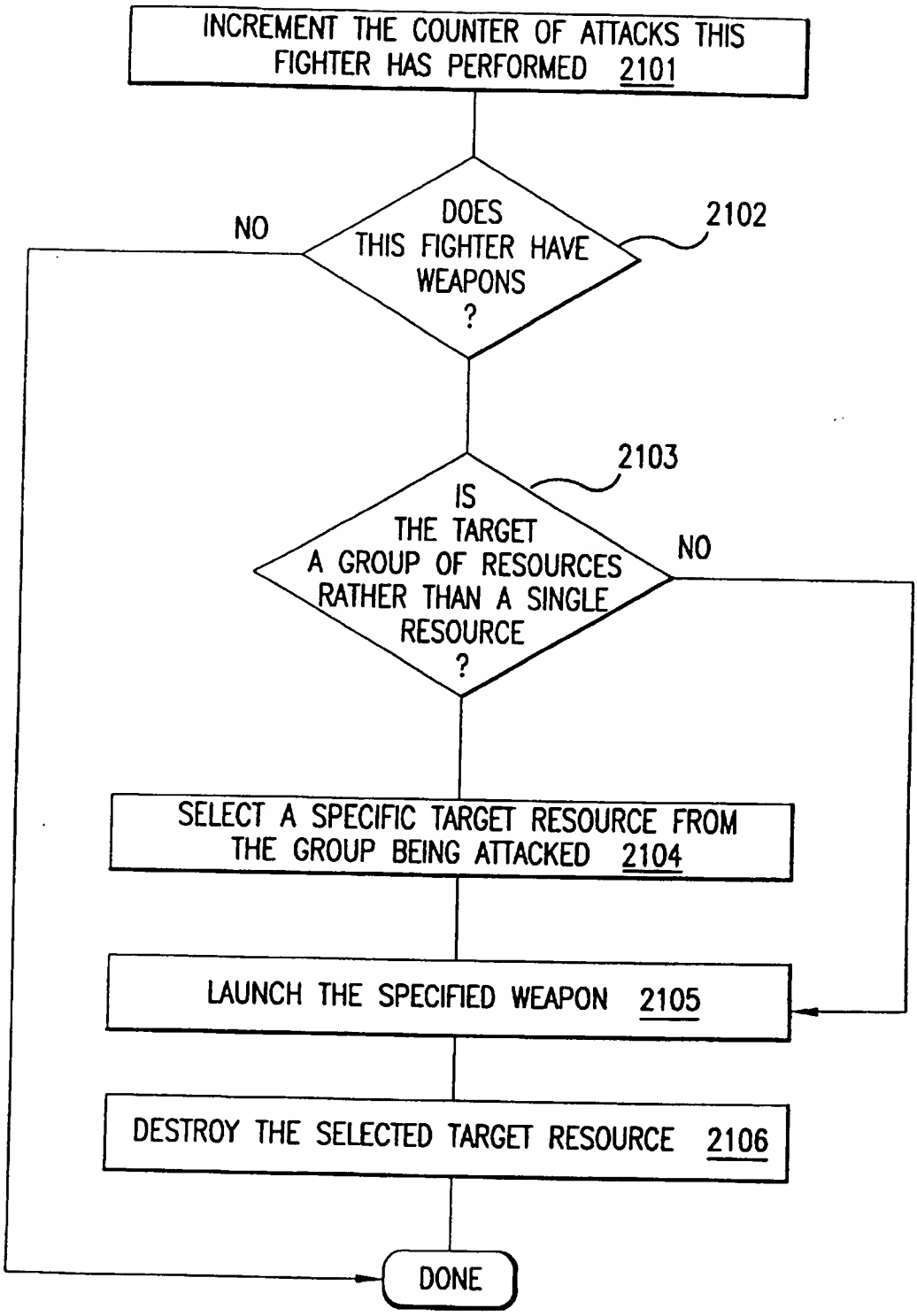

INCREMENT THE COUNTER OF ATTACKS THIS FIGHTER HAS PERFORMED 2101
DOES THIS FIGHTER HAVE WEAPONS ?
2102
NO
IS THE TARGET A GROUP OF RESOURCES RATHER THAN A SINGLE RESOURCE ?
2103
NO
SELECT A SPECIFIC TARGET RESOURCE FROM THE GROUP BEING ATTACKED 2104
LAUNCH THE SPECIFIED WEAPON 2105
DESTROY THE SELECTED TARGET RESOURCE 2106
DONE

FIG. 21

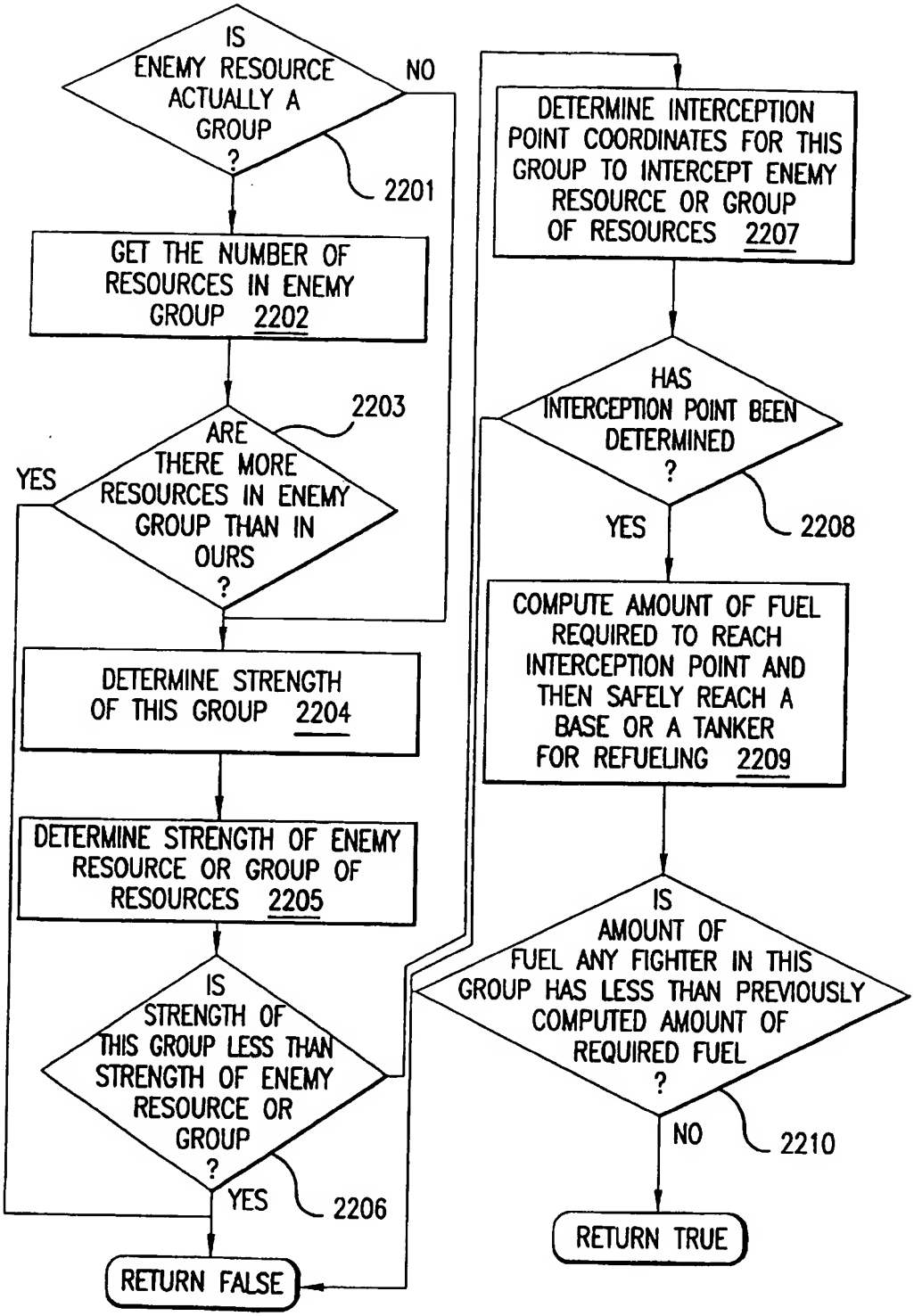

IS ENEMY RESOURCE ACTUALLY A GROUP ?
NO
2201
GET THE NUMBER OF RESOURCES IN ENEMY GROUP 2202
2203
ARE THERE MORE RESOURCES IN ENEMY GROUP THAN IN OURS ?
YES
DETERMINE STRENGTH OF THIS GROUP 2204
DETERMINE STRENGTH OF ENEMY RESOURCE OR GROUP OF RESOURCES 2205
IS STRENGTH OF THIS GROUP LESS THAN STRENGTH OF ENEMY RESOURCE OR GROUP ?
YES
2206
RETURN FALSE
DETERMINE INTERCEPTION POINT COORDINATES FOR THIS GROUP TO INTERCEPT ENEMY RESOURCE OR GROUP OF RESOURCES 2207
HAS INTERCEPTION POINT BEEN DETERMINED ?
YES
2208
COMPUTE AMOUNT OF FUEL REQUIRED TO REACH INTERCEPTION POINT AND THEN SAFELY REACH A BASE OR A TANKER FOR REFUELING 2209
IS AMOUNT OF FUEL ANY FIGHTER IN THIS GROUP HAS LESS THAN PREVIOUSLY COMPUTED AMOUNT OF REQUIRED FUEL ?
NO
2210
RETURN TRUE

FIG. 22

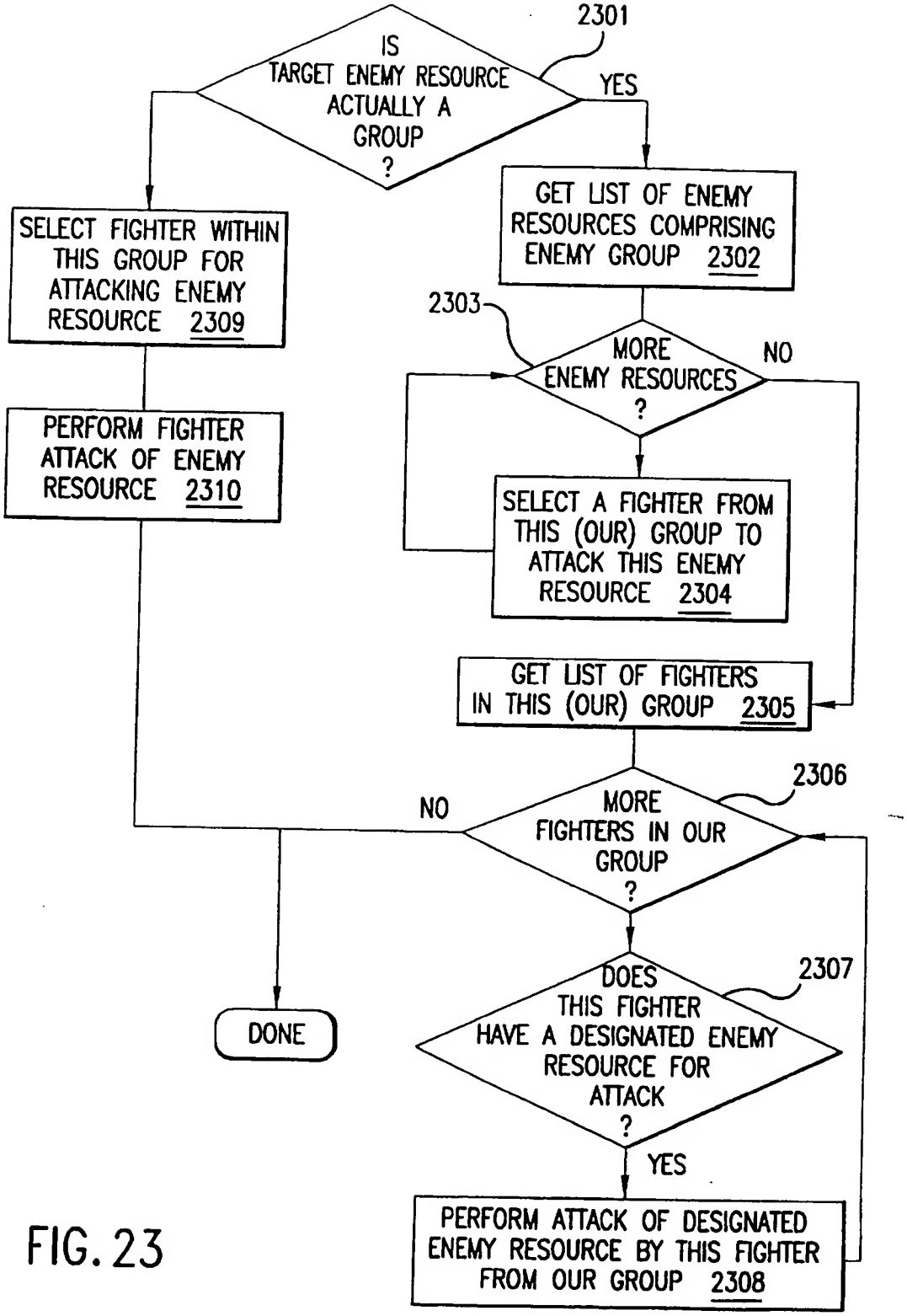

2301
IS TARGET ENEMY RESOURCE ACTUALLY A GROUP ?
YES
SELECT FIGHTER WITHIN THIS GROUP FOR ATTACKING ENEMY RESOURCE 2309
PERFORM FIGHTER ATTACK OF ENEMY RESOURCE 2310
GET LIST OF ENEMY RESOURCES COMPRISING ENEMY GROUP 2302
2303
MORE ENEMY RESOURCES ?
NO
SELECT A FIGHTER FROM THIS (OUR) GROUP TO ATTACK THIS ENEMY RESOURCE 2304
GET LIST OF FIGHTERS IN THIS (OUR) GROUP 2305
2306
MORE FIGHTERS IN OUR GROUP ?
NO
DONE
2307
DOES THIS FIGHTER HAVE A DESIGNATED ENEMY RESOURCE FOR ATTACK ?
YES
PERFORM ATTACK OF DESIGNATED ENEMY RESOURCE BY THIS FIGHTER FROM OUR GROUP 2308

FIG. 23

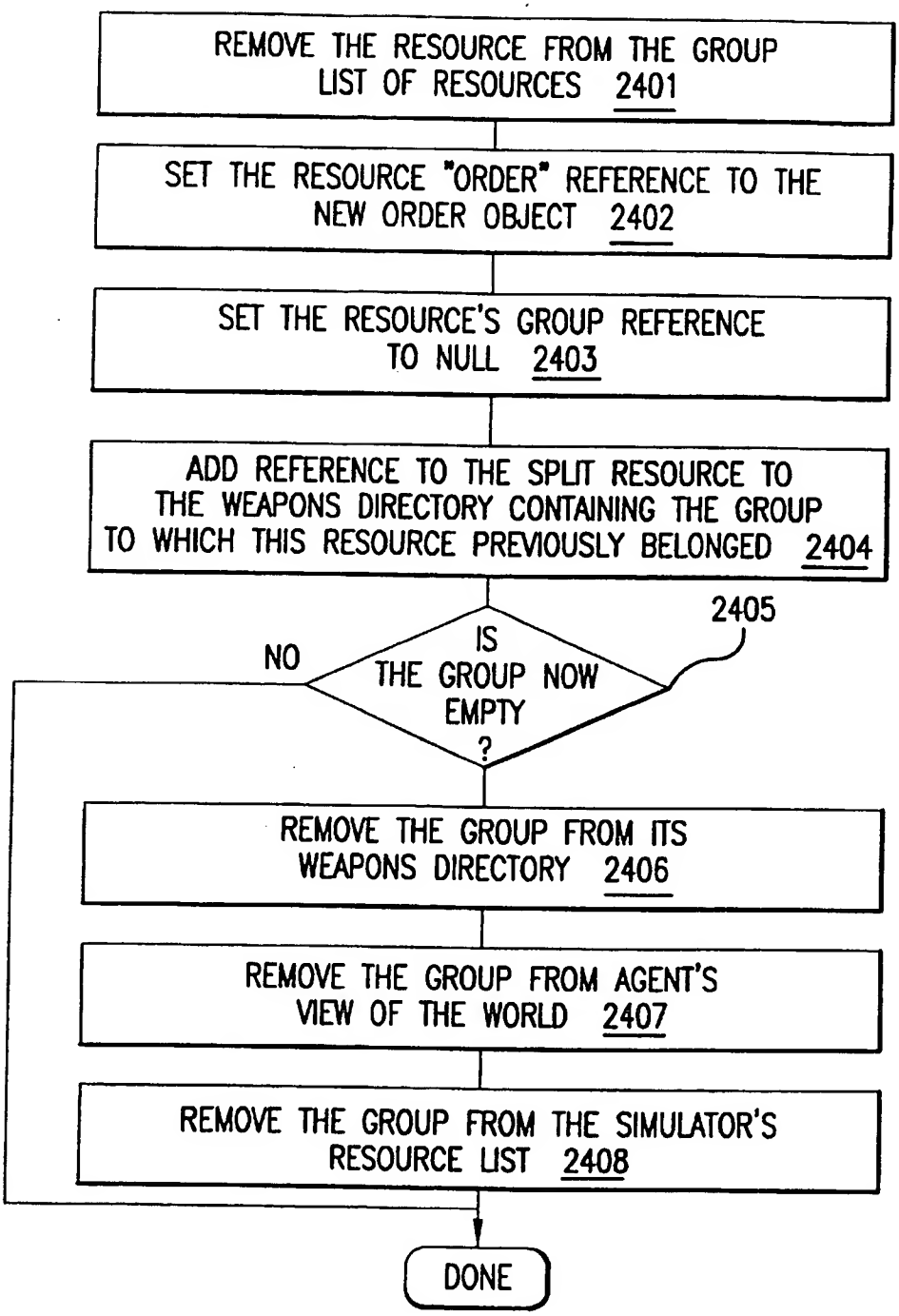

REMOVE THE RESOURCE FROM THE GROUP LIST OF RESOURCES 2401
SET THE RESOURCE "ORDER" REFERENCE TO THE NEW ORDER OBJECT 2402
SET THE RESOURCE'S GROUP REFERENCE TO NULL 2403
ADD REFERENCE TO THE SPLIT RESOURCE TO THE WEAPONS DIRECTORY CONTAINING THE GROUP TO WHICH THIS RESOURCE PREVIOUSLY BELONGED 2404
2405
IS THE GROUP NOW EMPTY ?
NO
REMOVE THE GROUP FROM ITS WEAPONS DIRECTORY 2406
REMOVE THE GROUP FROM AGENT'S VIEW OF THE WORLD 2407
REMOVE THE GROUP FROM THE SIMULATOR'S RESOURCE LIST 2408
DONE

FIG. 24

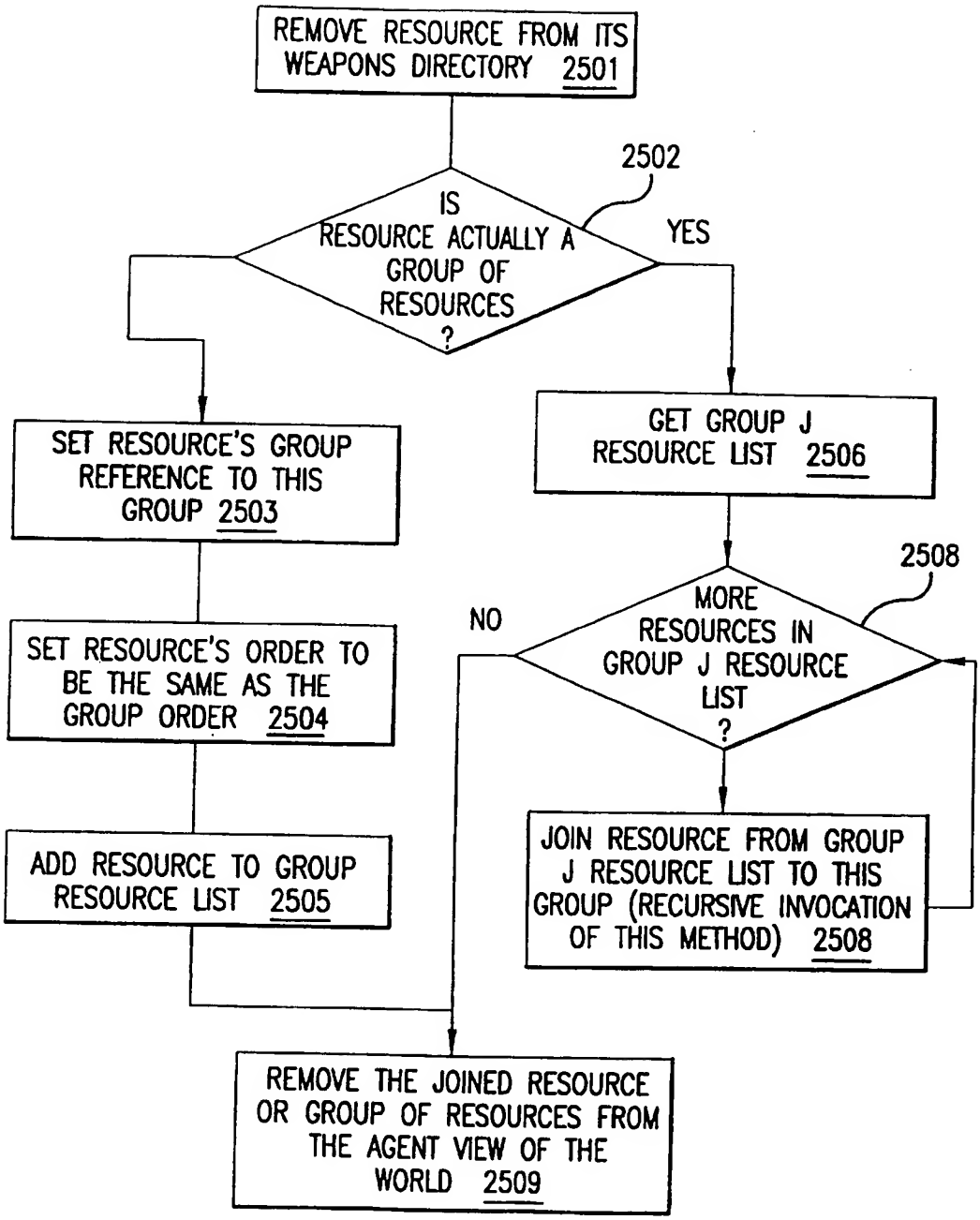

REMOVE RESOURCE FROM ITS WEAPONS DIRECTORY 2501
2502
IS RESOURCE ACTUALLY A GROUP OF RESOURCES ?
YES
SET RESOURCE'S GROUP REFERENCE TO THIS GROUP 2503
SET RESOURCE'S ORDER TO BE THE SAME AS THE GROUP ORDER 2504
ADD RESOURCE TO GROUP RESOURCE LIST 2505
GET GROUP J RESOURCE LIST 2506
2508
MORE RESOURCES IN GROUP J RESOURCE LIST ?
NO
JOIN RESOURCE FROM GROUP J RESOURCE LIST TO THIS GROUP (RECURSIVE INVOCATION OF THIS METHOD) 2508
REMOVE THE JOINED RESOURCE OR GROUP OF RESOURCES FROM THE AGENT VIEW OF THE WORLD 2509

FIG. 25

IDENTIFIER	TYPE	DESCRIPTION
LANE	LANE	THE LANE ASSIGNED TO THIS WEAPONS DIRECTOR
CAPS	VECTOR	THE LIST OF COMBAT AIR PATROL (CAP) ZONES ASSIGNED TO THIS WEAPONS DIRECTOR
WD	WEAPONSDIR	THE WEAPONS DIRECTORY THIS WEAPONS DIRECTOR IS RESPONSIBLE FOR MANAGING
LEVEL	INTEGER	RESPONSIBILITY LEVEL OF THE WEAPONS DIRECTOR: 0-UNKNOWN 1-NOVICE 2-JOURNEYMAN 3-EXPERT 4-MASTER
ALLEGIANCE	INTEGER	ALLEGIANCE OF THE WEAPONS DIRECTOR (UNKNOWN, OURS, ENEMY)
SENIOR	SENIOR	SENIOR DIRECTOR TO WHOM THIS WEAPONS DIRECTOR REPORTS
HANDLE	VECTOR	LIST OF ENEMY RESOURCES THIS WEAPONS DIRECTOR NEEDS TO HANDLE
HUMAN	BOOLEAN	WEAPONS DIRECTOR IS OPERATING IN MANUAL MODE (AS OPPOSED TO AGENT-AUTOMATED)
RECOMMENDATIONS	VECTOR	LIST OF RECOMMENDATIONS FROM THE AGENT THE WEAPONS DIRECTOR RECEIVES AT EVERY TICK OF THE SIMULATION
RECOMMENDATIONS FROMHUMAN	VECTOR	LIST OF MANUALLY-ENTERED RECOMMENDATION/ORDER PAIRS FROM A HUMAN USER PASSED TO THIS WEAPONS DIRECTOR REPRESENTATION
EVENTS	VECTOR	LIST OF EVENTS THAT OCCURRED DURING A SIMULATION TICK WHICH THE AGENT CONSIDERS TO BE OF INTEREST TO THIS WEAPONS DIRECTOR
RATIONALE	VECTOR	LIST OF TEXTUAL ENTRIES, EACH CORRESPONDING TO A RECOMMENDATION IN THE "RECOMMENDATIONS" LIST, COMPRISING THE AGENT'S EXPLANATIONS OF REASONS FOR EACH RECOMMENDATION

FIG. 26

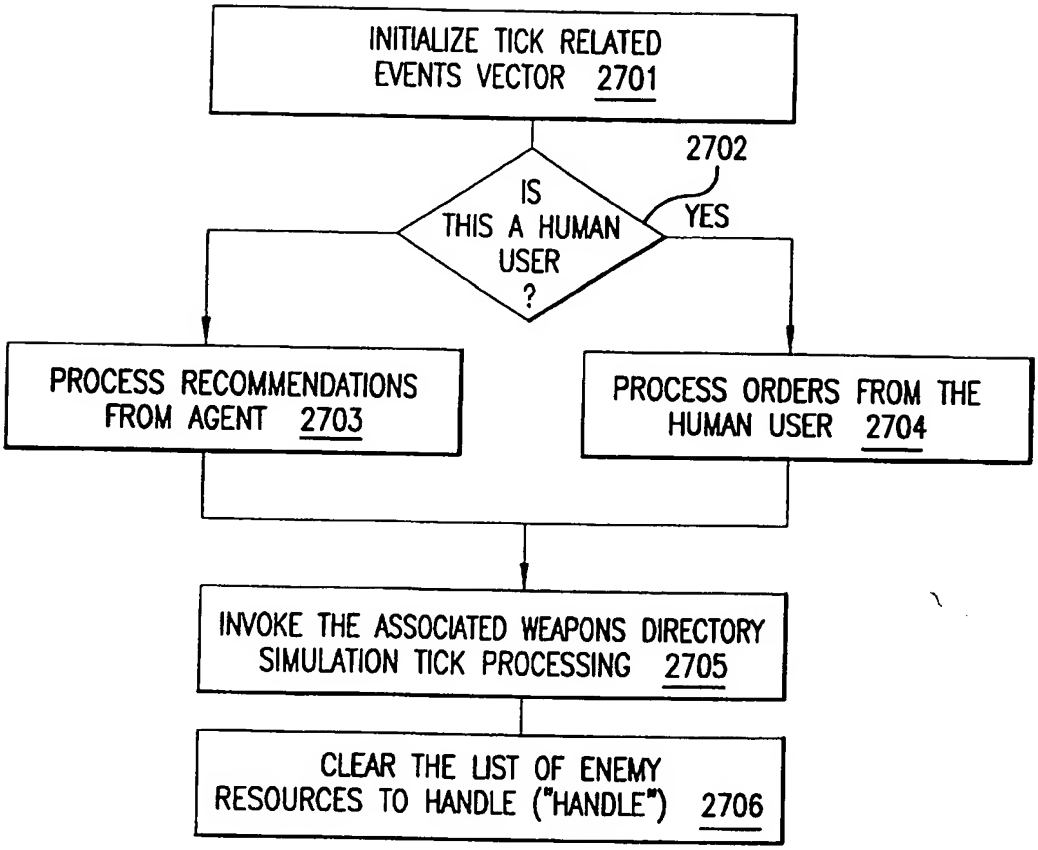

INITIALIZE TICK RELATED EVENTS VECTOR 2701
2702
IS THIS A HUMAN USER ?
YES
PROCESS RECOMMENDATIONS FROM AGENT 2703
PROCESS ORDERS FROM THE HUMAN USER 2704
INVOKE THE ASSOCIATED WEAPONS DIRECTORY SIMULATION TICK PROCESSING 2705
CLEAR THE LIST OF ENEMY RESOURCES TO HANDLE ("HANDLE") 2706

FIG. 27

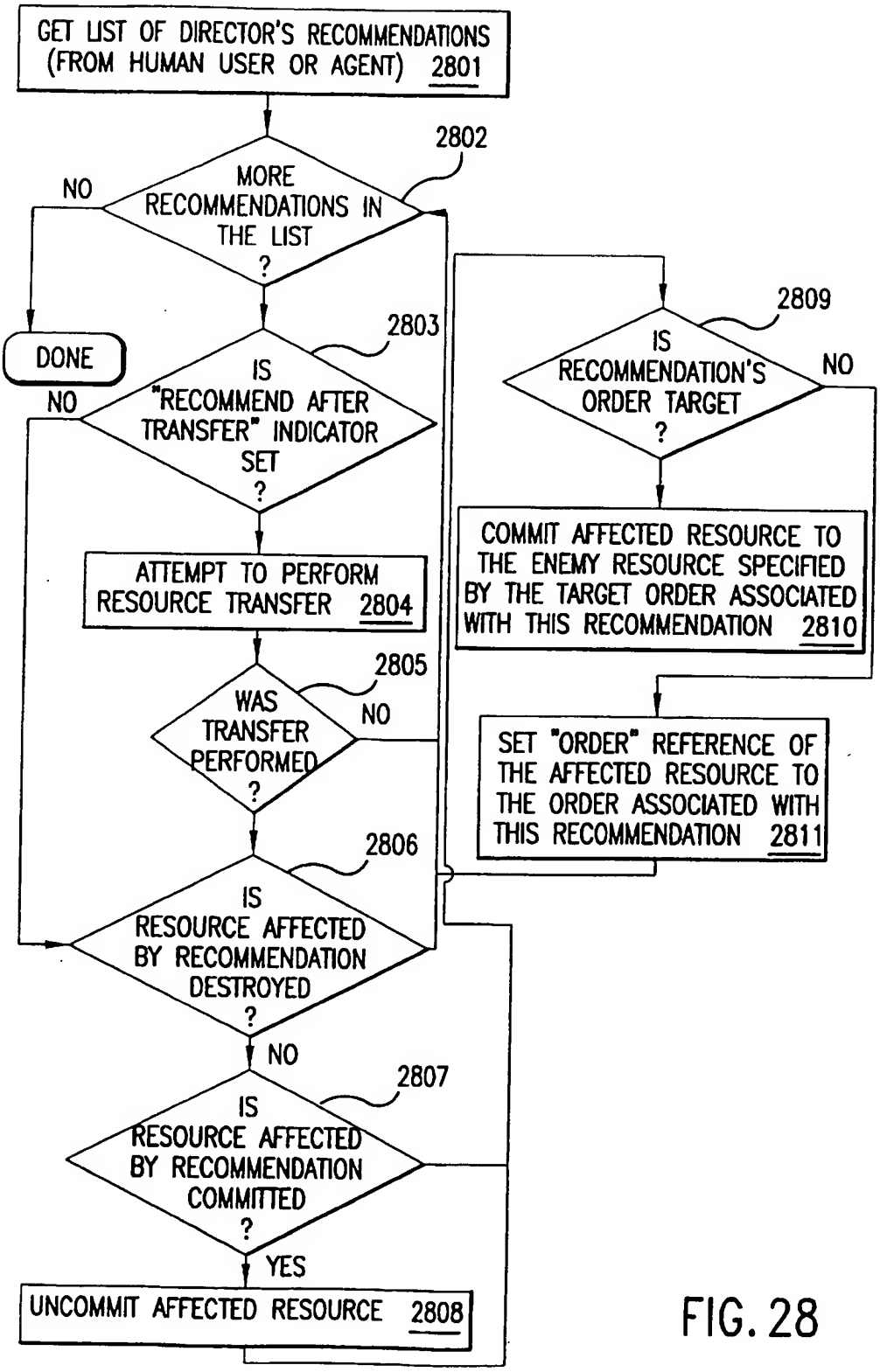

GET LIST OF DIRECTOR'S RECOMMENDATIONS (FROM HUMAN USER OR AGENT) 2801
2802
MORE RECOMMENDATIONS IN THE LIST ?
NO
DONE
2803
IS "RECOMMEND AFTER TRANSFER" INDICATOR SET ?
NO
ATTEMPT TO PERFORM RESOURCE TRANSFER 2804
2805
WAS TRANSFER PERFORMED ?
NO
2806
IS RESOURCE AFFECTED BY RECOMMENDATION DESTROYED ?
NO
2807
IS RESOURCE AFFECTED BY RECOMMENDATION COMMITTED ?
YES
UNCOMMIT AFFECTED RESOURCE 2808
2809
IS RECOMMENDATION'S ORDER TARGET ?
NO
COMMIT AFFECTED RESOURCE TO THE ENEMY RESOURCE SPECIFIED BY THE TARGET ORDER ASSOCIATED WITH THIS RECOMMENDATION 2810
SET "ORDER" REFERENCE OF THE AFFECTED RESOURCE TO THE ORDER ASSOCIATED WITH THIS RECOMMENDATION 2811

FIG. 28

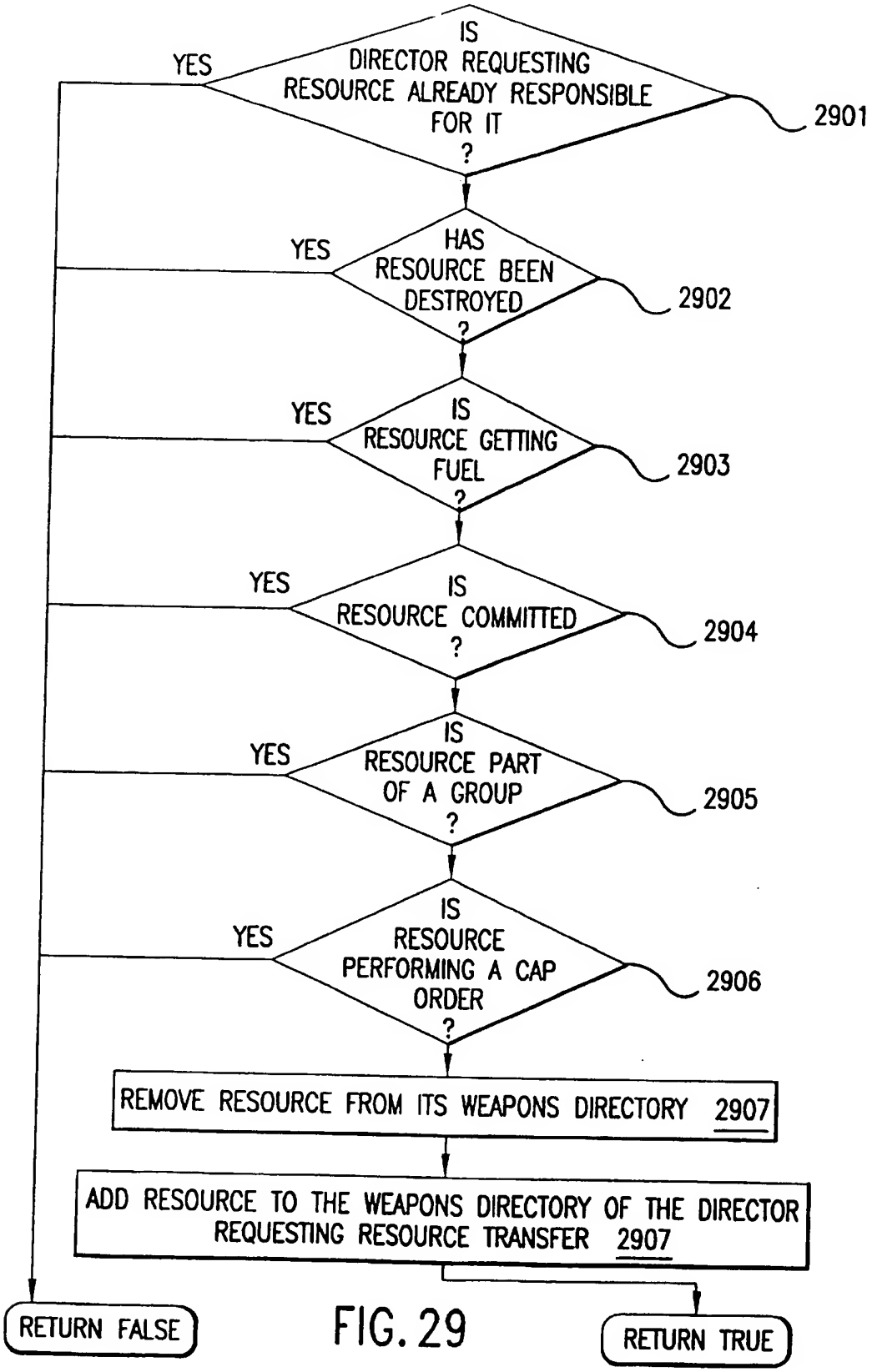

IS DIRECTOR REQUESTING RESOURCE ALREADY RESPONSIBLE FOR IT ?
YES
2901
HAS RESOURCE BEEN DESTROYED ?
YES
2902
IS RESOURCE GETTING FUEL ?
YES
2903
IS RESOURCE COMMITTED ?
YES
2904
IS RESOURCE PART OF A GROUP ?
YES
2905
IS RESOURCE PERFORMING A CAP ORDER ?
YES
2906
REMOVE RESOURCE FROM ITS WEAPONS DIRECTORY 2907
ADD RESOURCE TO THE WEAPONS DIRECTORY OF THE DIRECTOR REQUESTING RESOURCE TRANSFER 2907
RETURN FALSE
RETURN TRUE

FIG. 29

IDENTIFIER	TYPE	DESCRIPTION
NAME	STRING	RECOMMENDATION IDENTIFIER
TOWHOM	DIRECTOR	REFERENCE TO THE WEAPONS DIRECTOR TO WHOM THE RECOMMENDATION IS MADE
R	VECTOR	LIST OF RESOURCES AFFECTED BY THIS RECOMMENDATION
ORDER	ORDER	ORDERS FOR RESOURCES AFFECTED BY THIS RECOMMENDATION
DESC	STRING	VERBAL DESCRIPTION OF THE RECOMMENDATION
ACCEPTED	BOOLEAN	INDICATOR OF ACCEPTANCE BY THE DIRECTOR (OR THE AGENT ON BEHALF OF THE DIRECTOR IF DIRECTOR IS AUTOMATED BY THE AGENT)
TRANSFER	BOOLEAN	RECOMMENDATION IS VALID ONLY AFTER THE SPECIFIED RESOURCES HAVE BEEN TRANSFERRED TO THIS WEAPONS DIRECTOR WITH THE APPROVAL FROM THE SENIOR DIRECTOR

FIG. 30

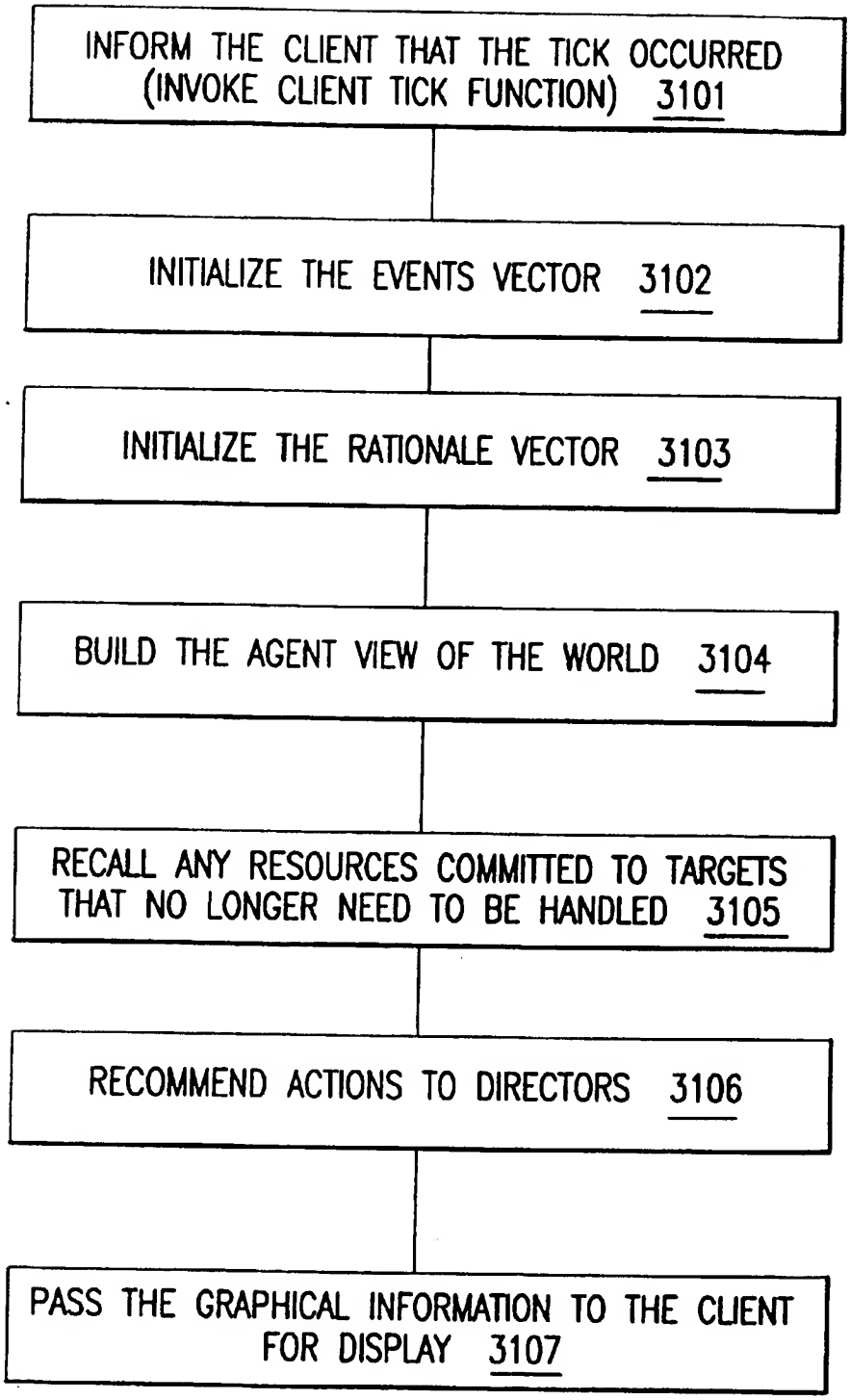

INFORM THE CLIENT THAT THE TICK OCCURRED (INVOKE CLIENT TICK FUNCTION) 3101
INITIALIZE THE EVENTS VECTOR 3102
INITIALIZE THE RATIONALE VECTOR 3103
BUILD THE AGENT VIEW OF THE WORLD 3104
RECALL ANY RESOURCES COMMITTED TO TARGETS THAT NO LONGER NEED TO BE HANDLED 3105
RECOMMEND ACTIONS TO DIRECTORS 3106
PASS THE GRAPHICAL INFORMATION TO THE CLIENT FOR DISPLAY 3107

FIG. 31

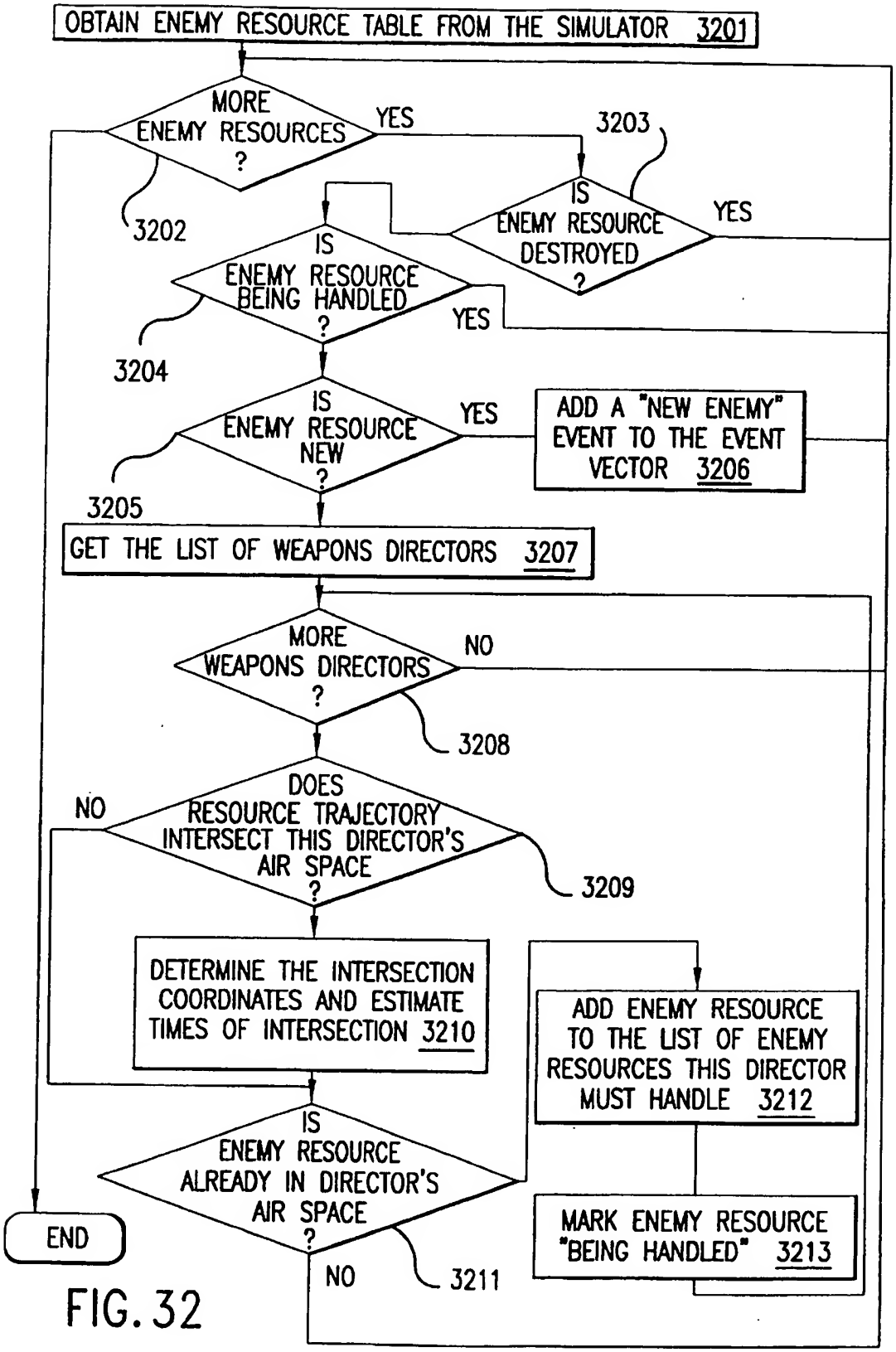

OBTAIN ENEMY RESOURCE TABLE FROM THE SIMULATOR 3201
MORE ENEMY RESOURCES ?
YES
3202
3203
IS ENEMY RESOURCE DESTROYED ?
YES
IS ENEMY RESOURCE BEING HANDLED ?
YES
3204
IS ENEMY RESOURCE NEW ?
YES
ADD A "NEW ENEMY" EVENT TO THE EVENT VECTOR 3206
3205
GET THE LIST OF WEAPONS DIRECTORS 3207
MORE WEAPONS DIRECTORS ?
NO
3208
DOES RESOURCE TRAJECTORY INTERSECT THIS DIRECTOR'S AIR SPACE ?
NO
3209
DETERMINE THE INTERSECTION COORDINATES AND ESTIMATE TIMES OF INTERSECTION 3210
ADD ENEMY RESOURCE TO THE LIST OF ENEMY RESOURCES THIS DIRECTOR MUST HANDLE 3212
IS ENEMY RESOURCE ALREADY IN DIRECTOR'S AIR SPACE ?
MARK ENEMY RESOURCE "BEING HANDLED" 3213
END
NO
3211

FIG. 32

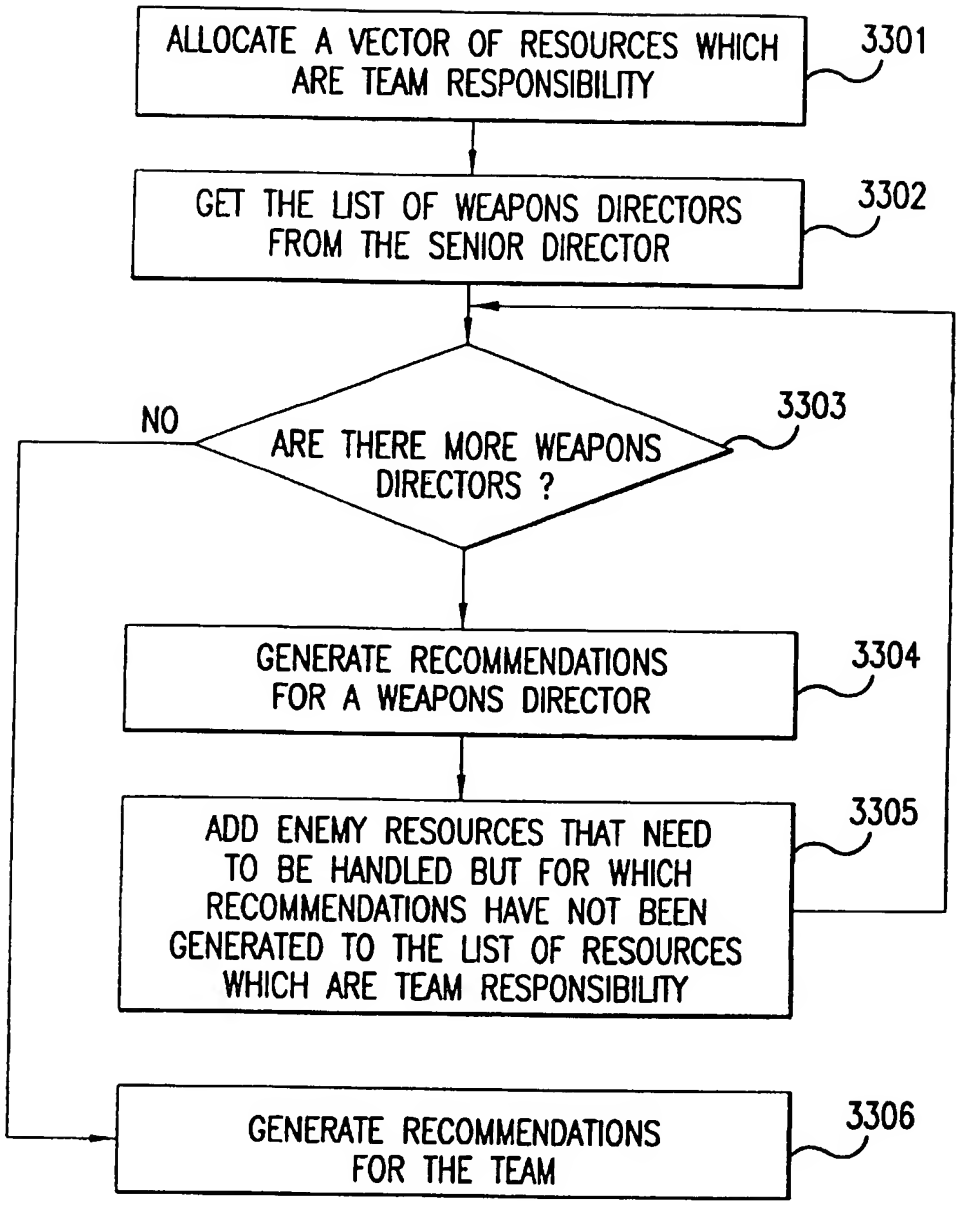

ALLOCATE A VECTOR OF RESOURCES WHICH ARE TEAM RESPONSIBILITY
3301
GET THE LIST OF WEAPONS DIRECTORS FROM THE SENIOR DIRECTOR
3302
NO
ARE THERE MORE WEAPONS DIRECTORS ?
3303
GENERATE RECOMMENDATIONS FOR A WEAPONS DIRECTOR
3304
ADD ENEMY RESOURCES THAT NEED TO BE HANDLED BUT FOR WHICH RECOMMENDATIONS HAVE NOT BEEN GENERATED TO THE LIST OF RESOURCES WHICH ARE TEAM RESPONSIBILITY
3305
GENERATE RECOMMENDATIONS FOR THE TEAM
3306

FIG.33

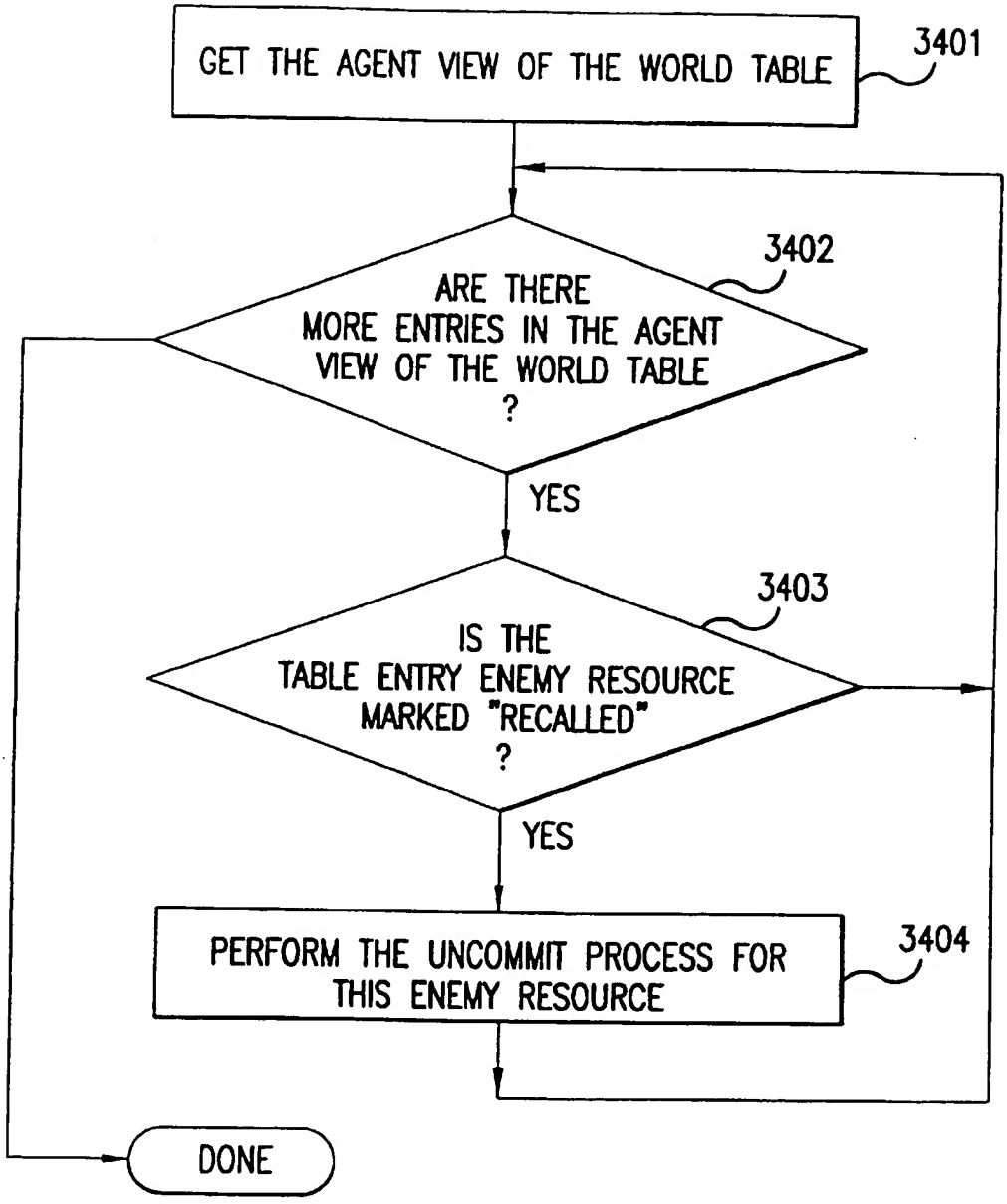

GET THE AGENT VIEW OF THE WORLD TABLE
3401
3402
ARE THERE MORE ENTRIES IN THE AGENT VIEW OF THE WORLD TABLE ?
YES
3403
IS THE TABLE ENTRY ENEMY RESOURCE MARKED "RECALLED" ?
YES
PERFORM THE UNCOMMIT PROCESS FOR THIS ENEMY RESOURCE
3404
DONE

FIG.34

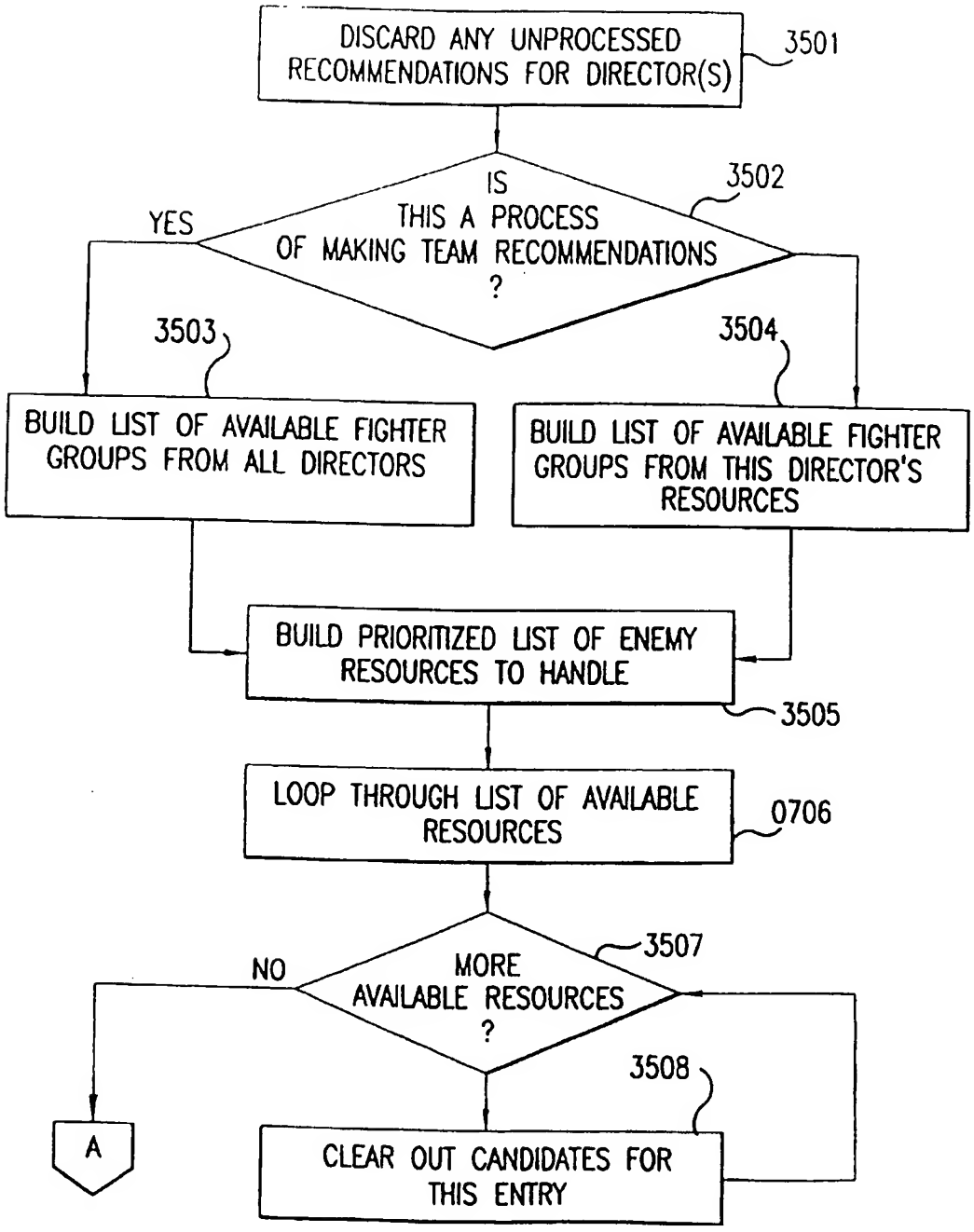

DISCARD ANY UNPROCESSED RECOMMENDATIONS FOR DIRECTOR(S)
3501
IS THIS A PROCESS OF MAKING TEAM RECOMMENDATIONS ?
3502
YES
3503
BUILD LIST OF AVAILABLE FIGHTER GROUPS FROM ALL DIRECTORS
3504
BUILD LIST OF AVAILABLE FIGHTER GROUPS FROM THIS DIRECTOR'S RESOURCES
BUILD PRIORITIZED LIST OF ENEMY RESOURCES TO HANDLE
3505
LOOP THROUGH LIST OF AVAILABLE RESOURCES
0706
MORE AVAILABLE RESOURCES ?
3507
NO
3508
CLEAR OUT CANDIDATES FOR THIS ENTRY
A

FIG.35A

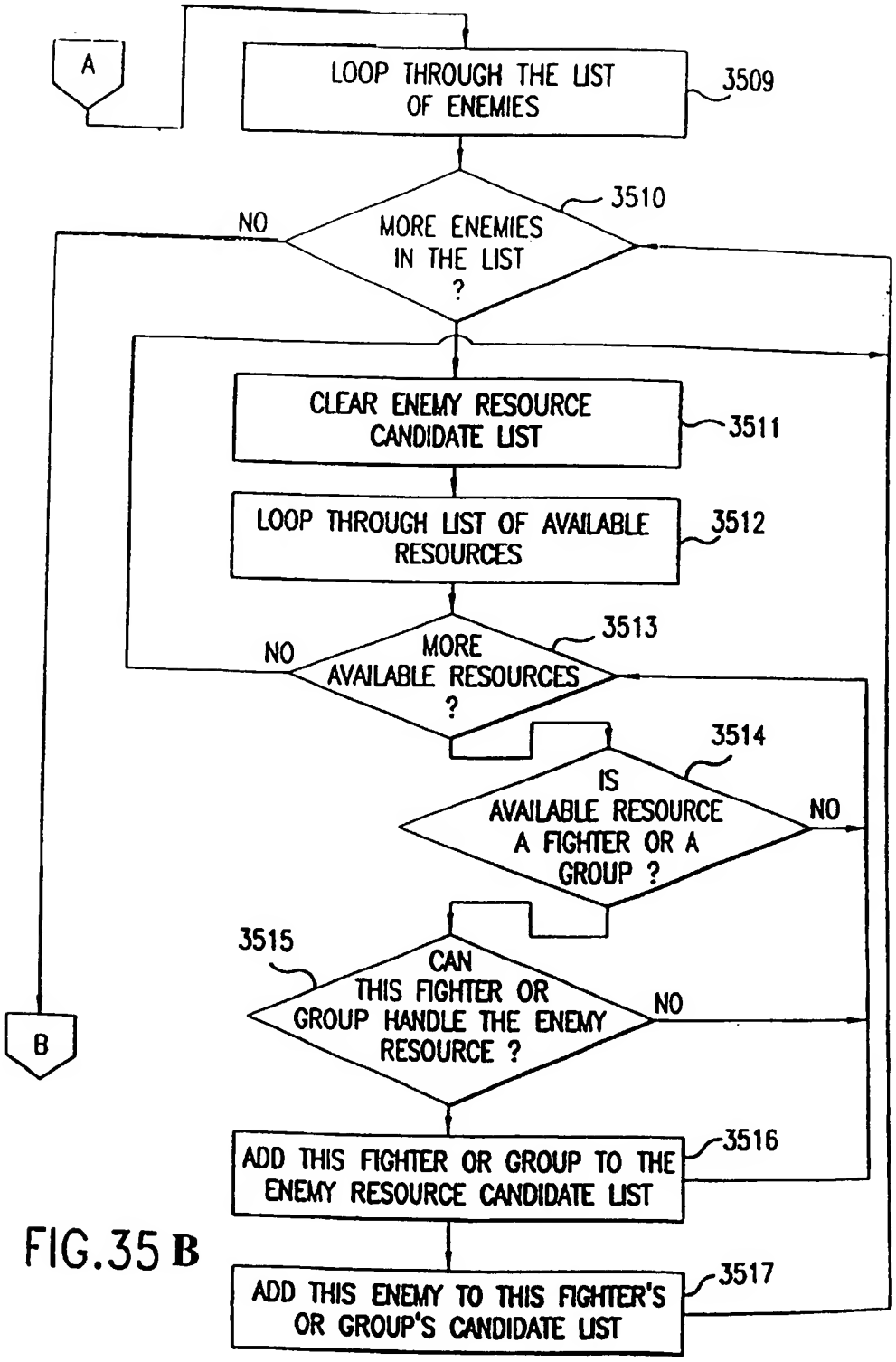

A
LOOP THROUGH THE LIST OF ENEMIES
3509
MORE ENEMIES IN THE LIST ?
3510
NO
CLEAR ENEMY RESOURCE CANDIDATE LIST
3511
LOOP THROUGH LIST OF AVAILABLE RESOURCES
3512
MORE AVAILABLE RESOURCES ?
3513
NO
IS AVAILABLE RESOURCE A FIGHTER OR A GROUP ?
3514
NO
CAN THIS FIGHTER OR GROUP HANDLE THE ENEMY RESOURCE ?
3515
NO
B
ADD THIS FIGHTER OR GROUP TO THE ENEMY RESOURCE CANDIDATE LIST
3516
ADD THIS ENEMY TO THIS FIGHTER'S OR GROUP'S CANDIDATE LIST
3517

FIG.35 B

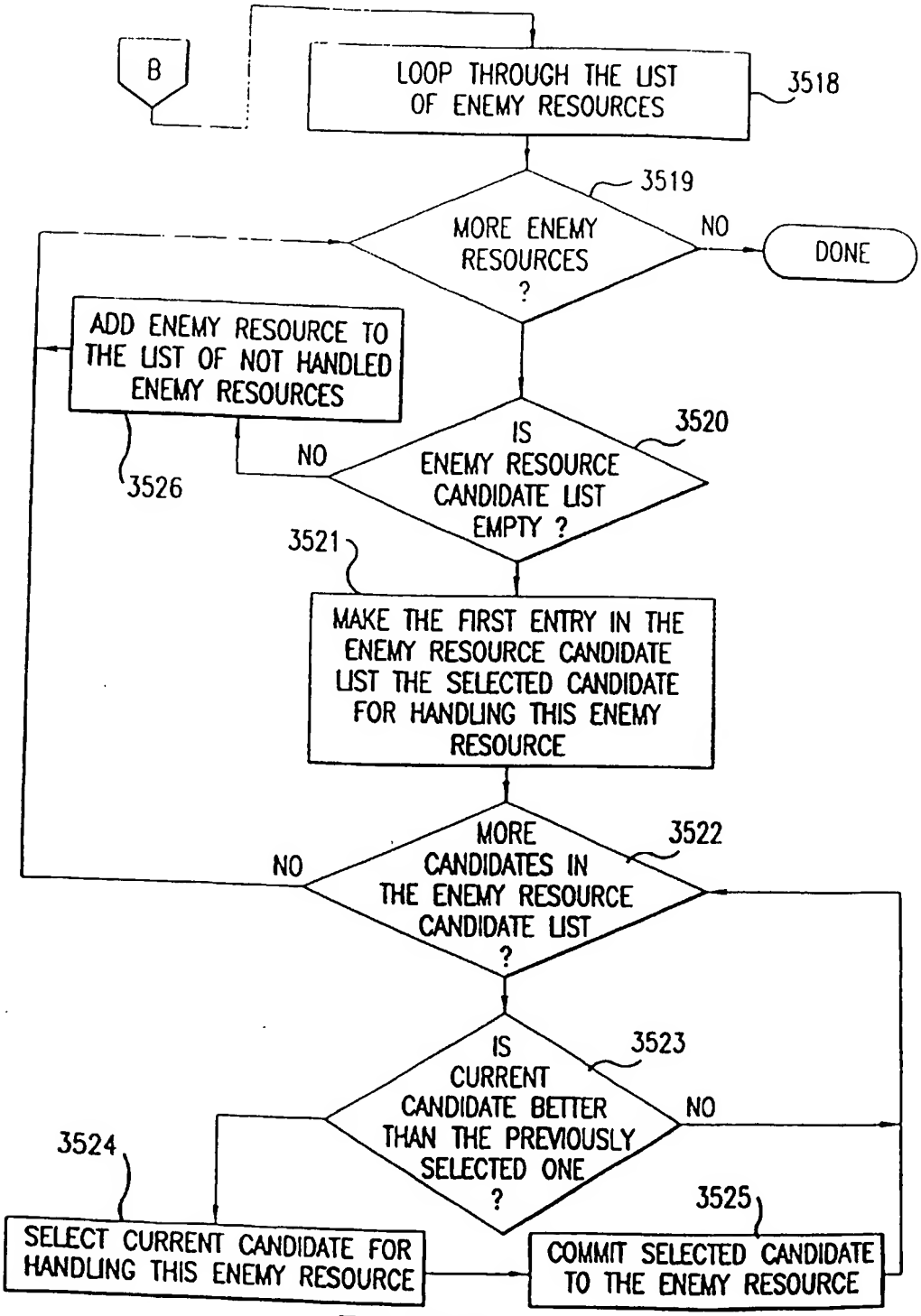

B
LOOP THROUGH THE LIST OF ENEMY RESOURCES
3518
3519
MORE ENEMY RESOURCES ?
NO
DONE
ADD ENEMY RESOURCE TO THE LIST OF NOT HANDLED ENEMY RESOURCES
3526
NO
IS ENEMY RESOURCE CANDIDATE LIST EMPTY ?
3520
3521
MAKE THE FIRST ENTRY IN THE ENEMY RESOURCE CANDIDATE LIST THE SELECTED CANDIDATE FOR HANDLING THIS ENEMY RESOURCE
NO
MORE CANDIDATES IN THE ENEMY RESOURCE CANDIDATE LIST ?
3522
IS CURRENT CANDIDATE BETTER THAN THE PREVIOUSLY SELECTED ONE ?
3523
NO
3524
3525
SELECT CURRENT CANDIDATE FOR HANDLING THIS ENEMY RESOURCE
COMMIT SELECTED CANDIDATE TO THE ENEMY RESOURCE

FIG.35C

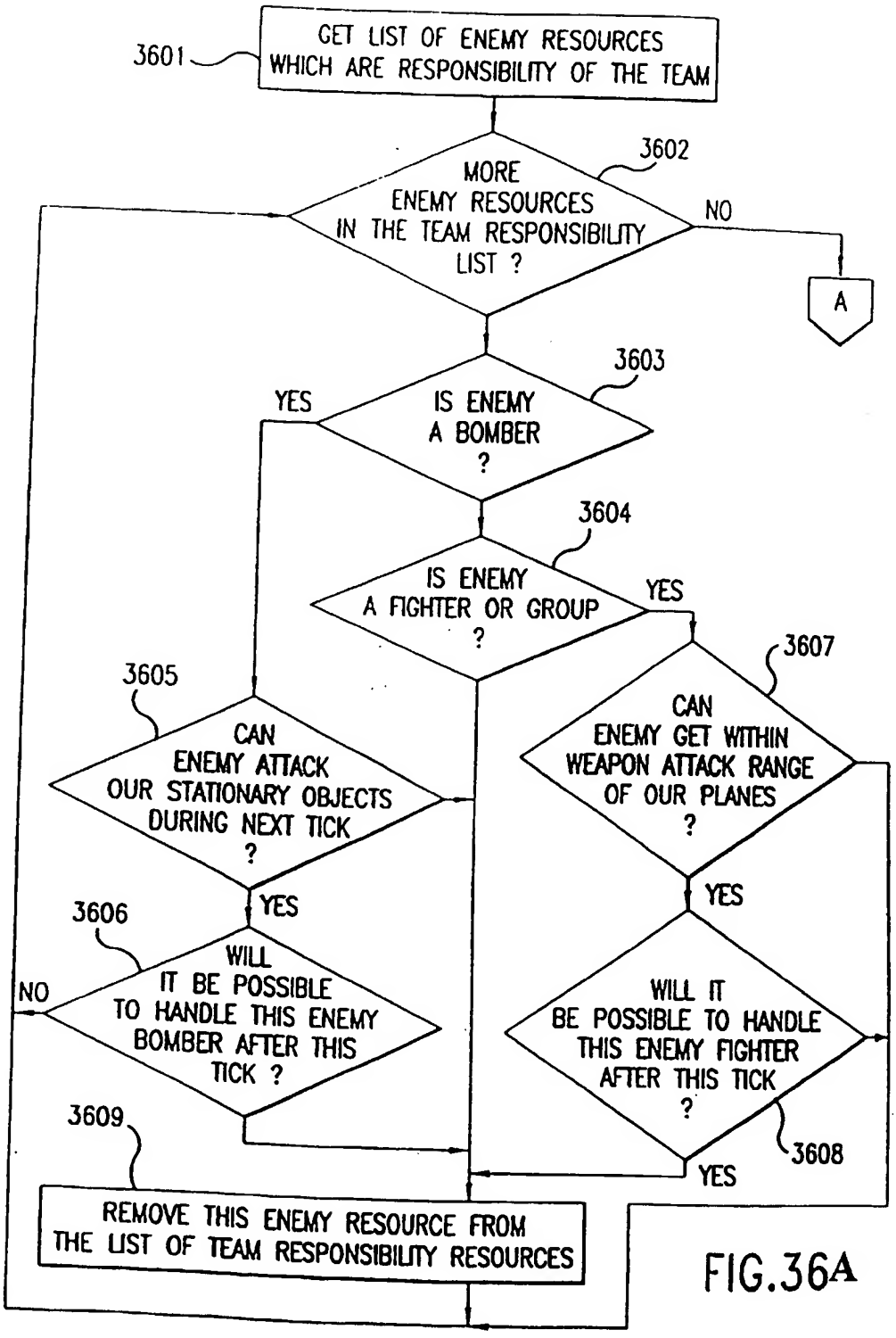

3601
GET LIST OF ENEMY RESOURCES WHICH ARE RESPONSIBILITY OF THE TEAM
3602
MORE ENEMY RESOURCES IN THE TEAM RESPONSIBILITY LIST ?
NO
A
3603
YES
IS ENEMY A BOMBER ?
3604
IS ENEMY A FIGHTER OR GROUP ?
YES
3605
CAN ENEMY ATTACK OUR STATIONARY OBJECTS DURING NEXT TICK ?
3607
CAN ENEMY GET WITHIN WEAPON ATTACK RANGE OF OUR PLANES ?
YES
3606
WILL IT BE POSSIBLE TO HANDLE THIS ENEMY BOMBER AFTER THIS TICK ?
NO
YES
WILL IT BE POSSIBLE TO HANDLE THIS ENEMY FIGHTER AFTER THIS TICK ?
3608
YES
3609
REMOVE THIS ENEMY RESOURCE FROM THE LIST OF TEAM RESPONSIBILITY RESOURCES

FIG.36A

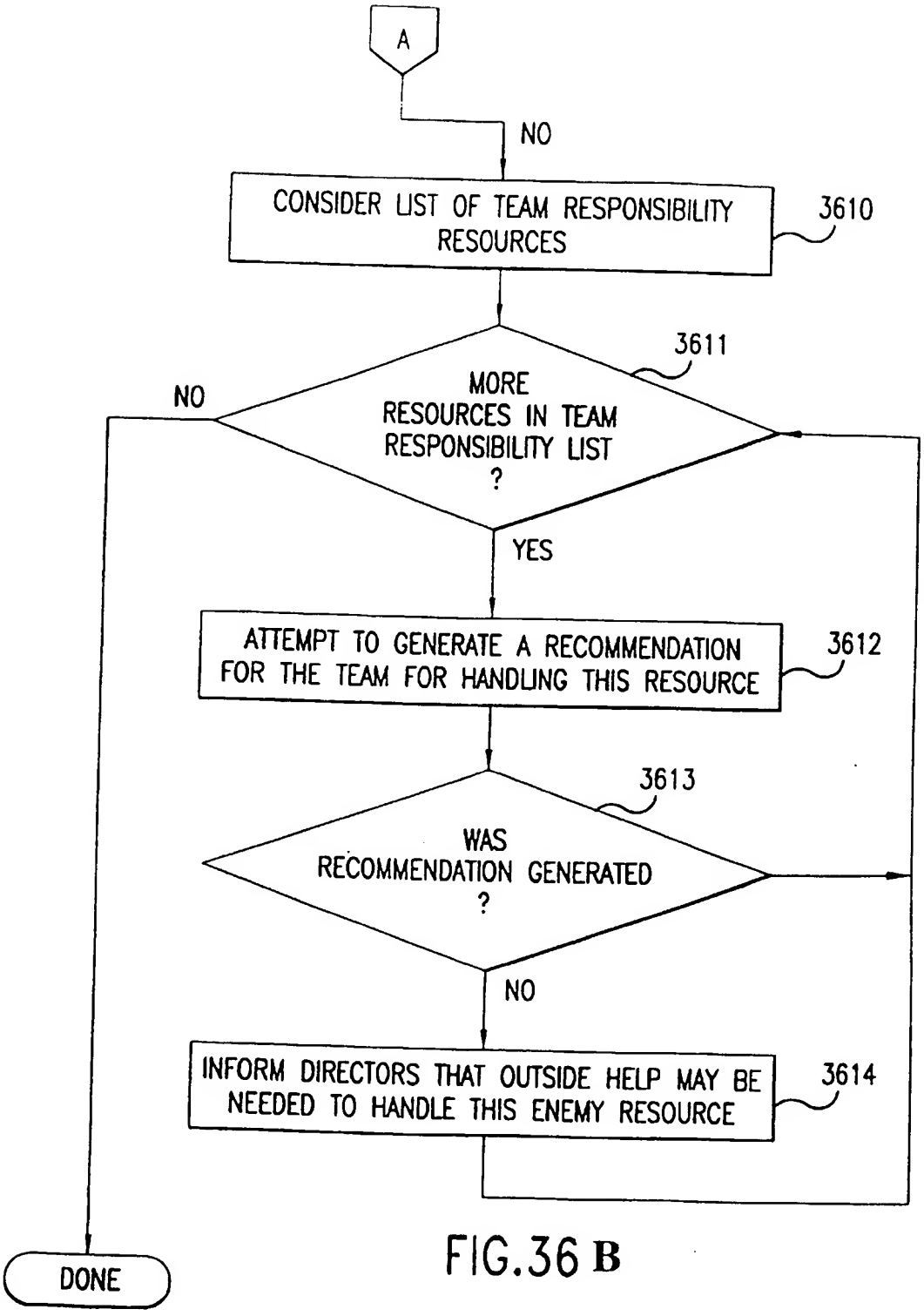

A
NO
CONSIDER LIST OF TEAM RESPONSIBILITY RESOURCES
3610
3611
MORE RESOURCES IN TEAM RESPONSIBILITY LIST ?
NO
YES
ATTEMPT TO GENERATE A RECOMMENDATION FOR THE TEAM FOR HANDLING THIS RESOURCE
3612
3613
WAS RECOMMENDATION GENERATED ?
NO
INFORM DIRECTORS THAT OUTSIDE HELP MAY BE NEEDED TO HANDLE THIS ENEMY RESOURCE
3614
DONE

FIG.36 B

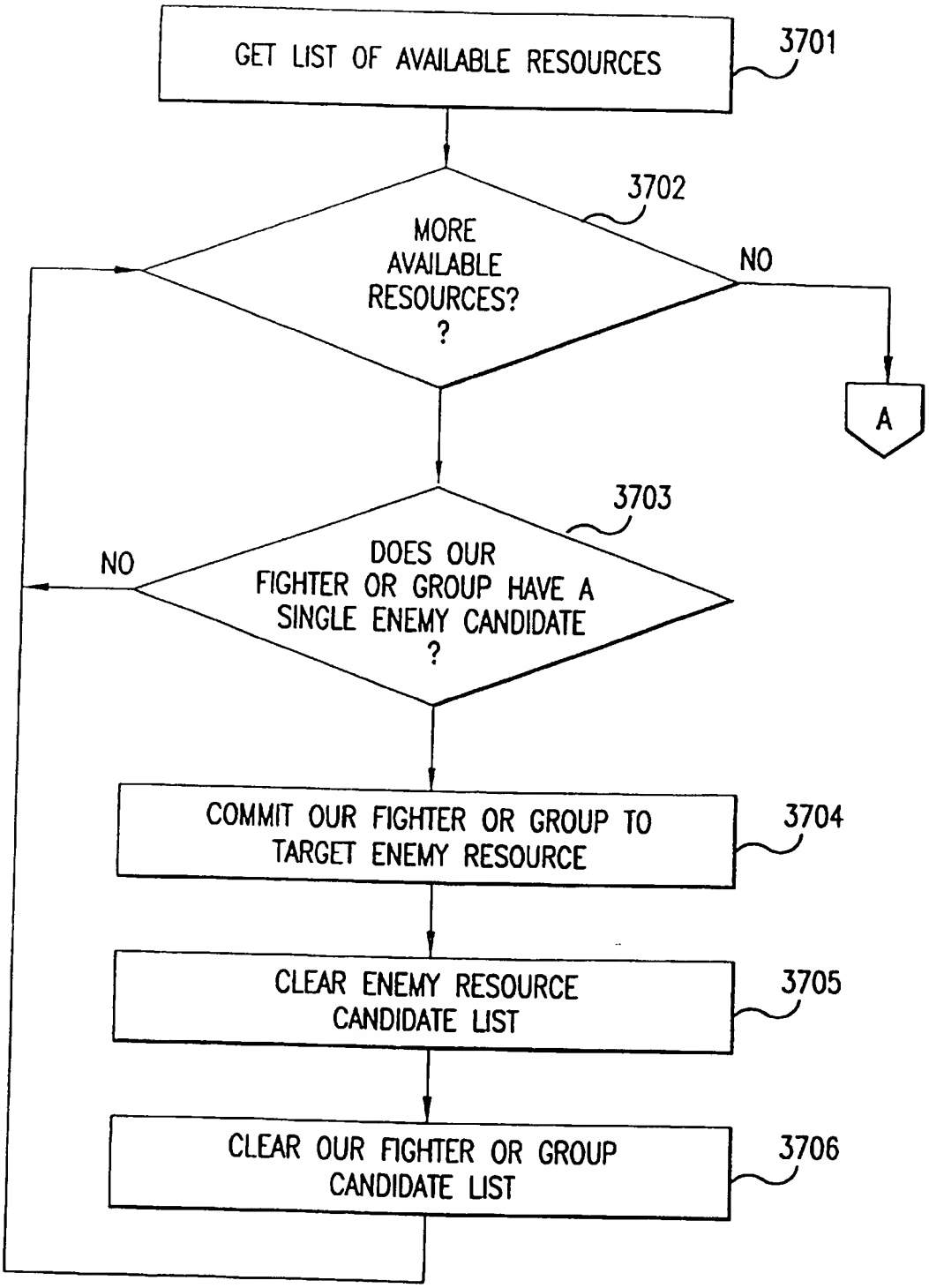

GET LIST OF AVAILABLE RESOURCES
3701
3702
MORE AVAILABLE RESOURCES? ?
NO
A
3703
NO
DOES OUR FIGHTER OR GROUP HAVE A SINGLE ENEMY CANDIDATE ?
COMMIT OUR FIGHTER OR GROUP TO TARGET ENEMY RESOURCE
3704
CLEAR ENEMY RESOURCE CANDIDATE LIST
3705
CLEAR OUR FIGHTER OR GROUP CANDIDATE LIST
3706

FIG.37A

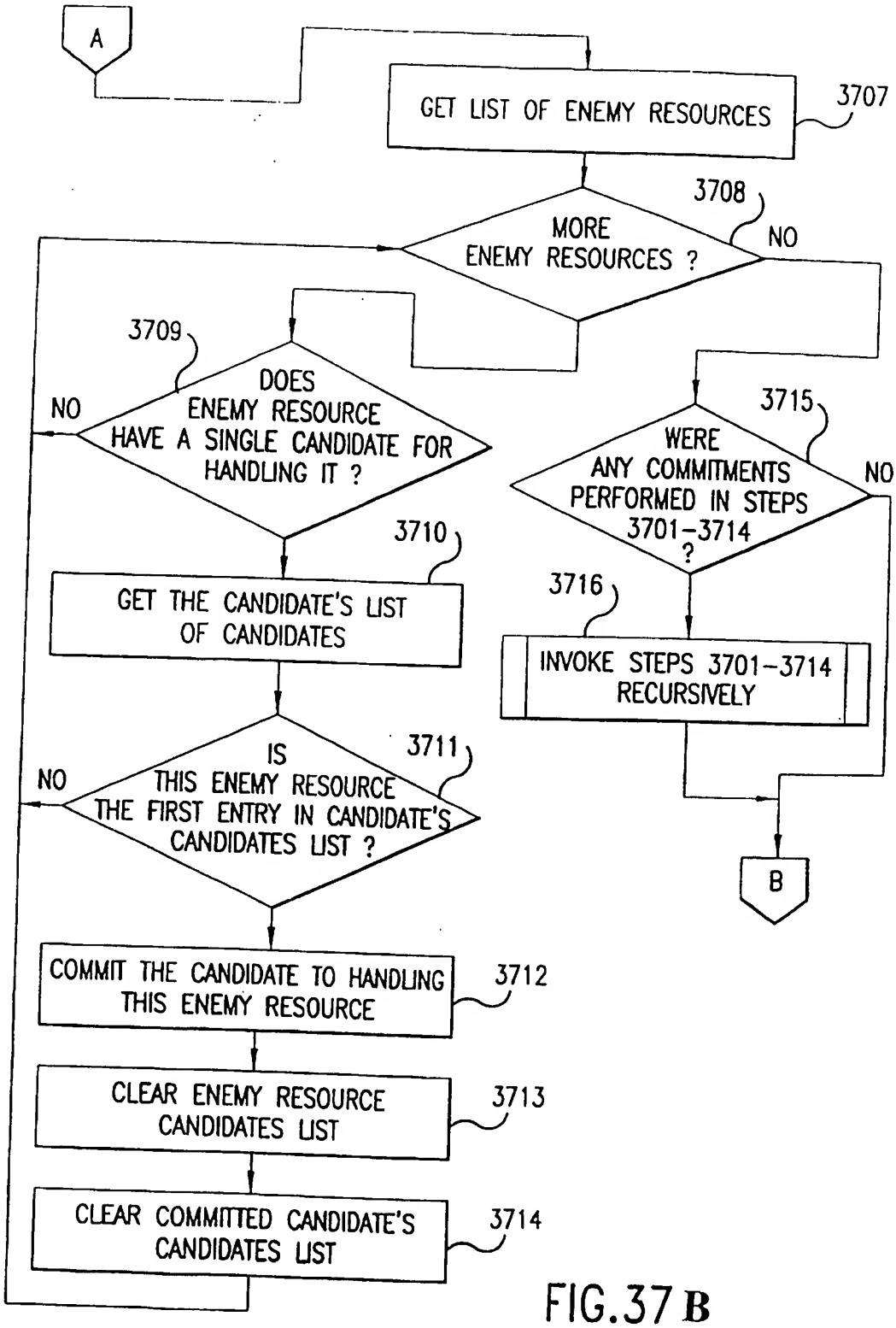

A
GET LIST OF ENEMY RESOURCES
3707
3708
MORE ENEMY RESOURCES ?
NO
3709
DOES ENEMY RESOURCE HAVE A SINGLE CANDIDATE FOR HANDLING IT ?
NO
3710
GET THE CANDIDATE'S LIST OF CANDIDATES
3711
IS THIS ENEMY RESOURCE THE FIRST ENTRY IN CANDIDATE'S CANDIDATES LIST ?
NO
COMMIT THE CANDIDATE TO HANDLING THIS ENEMY RESOURCE
3712
CLEAR ENEMY RESOURCE CANDIDATES LIST
3713
CLEAR COMMITTED CANDIDATE'S CANDIDATES LIST
3714
3715
WERE ANY COMMITMENTS PERFORMED IN STEPS 3701-3714 ?
NO
3716
INVOKE STEPS 3701-3714 RECURSIVELY
B

FIG.37 B

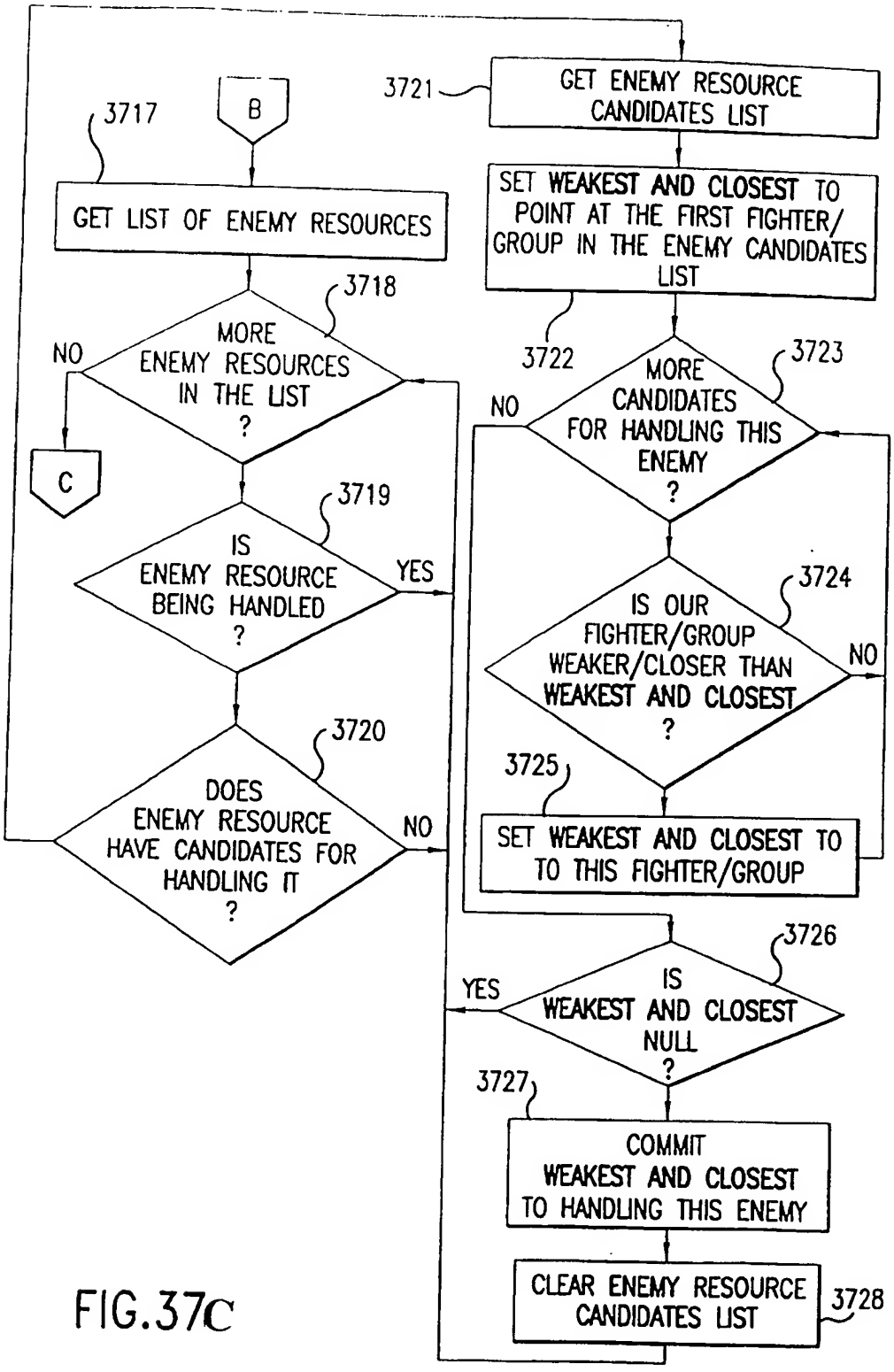

B
3717
GET LIST OF ENEMY RESOURCES
3718
MORE ENEMY RESOURCES IN THE LIST ?
NO
C
3719
IS ENEMY RESOURCE BEING HANDLED ?
YES
3720
DOES ENEMY RESOURCE HAVE CANDIDATES FOR HANDLING IT ?
NO
3721
GET ENEMY RESOURCE CANDIDATES LIST
SET WEAKEST AND CLOSEST TO POINT AT THE FIRST FIGHTER/ GROUP IN THE ENEMY CANDIDATES LIST
3722
3723
MORE CANDIDATES FOR HANDLING THIS ENEMY ?
NO
3724
IS OUR FIGHTER/GROUP WEAKER/CLOSER THAN WEAKEST AND CLOSEST ?
NO
3725
SET WEAKEST AND CLOSEST TO TO THIS FIGHTER/GROUP
3726
IS WEAKEST AND CLOSEST NULL ?
YES
3727
COMMIT WEAKEST AND CLOSEST TO HANDLING THIS ENEMY
CLEAR ENEMY RESOURCE CANDIDATES LIST
3728

FIG.37C

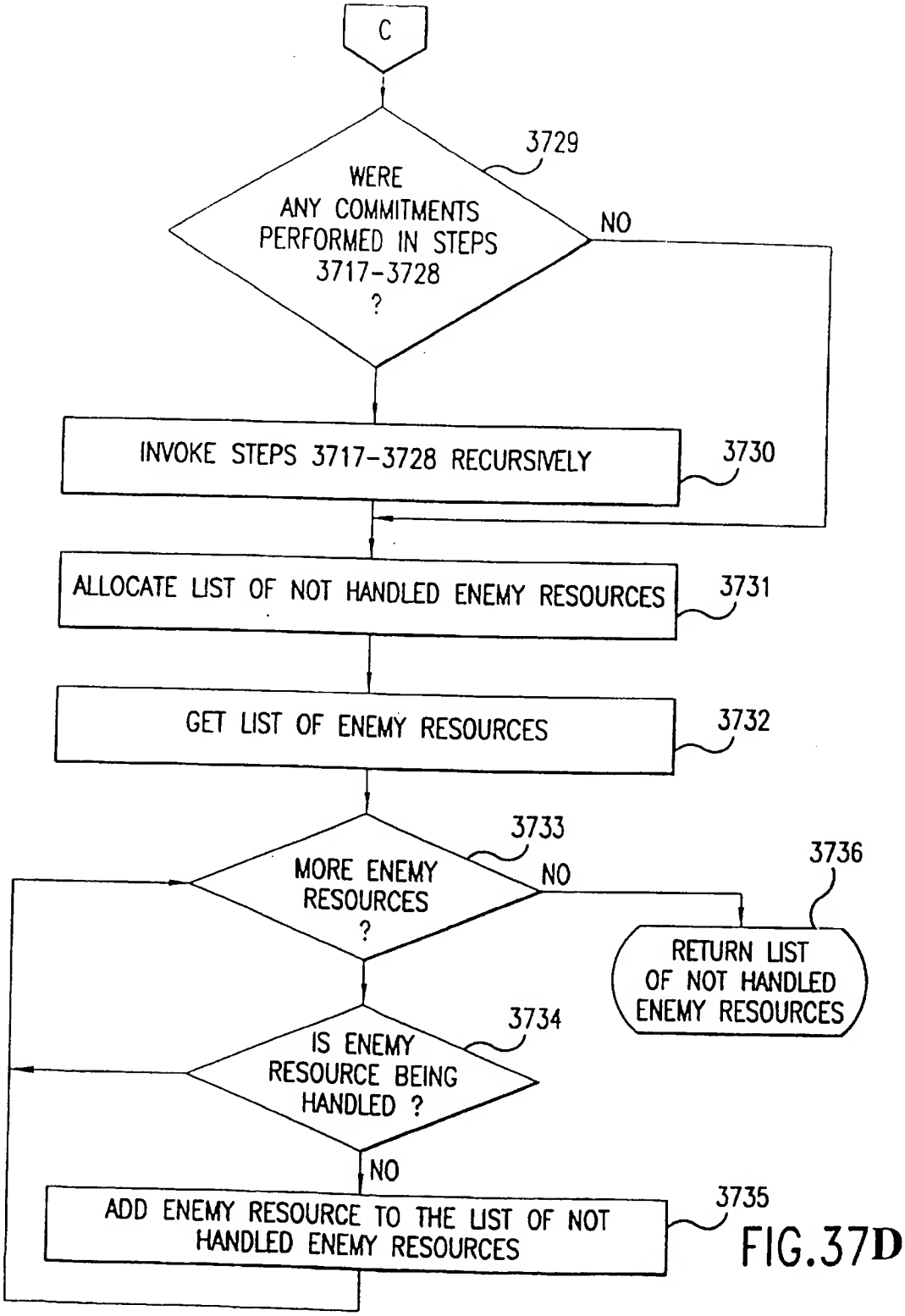

C
3729
WERE ANY COMMITMENTS PERFORMED IN STEPS 3717-3728 ?
NO
INVOKE STEPS 3717-3728 RECURSIVELY
3730
ALLOCATE LIST OF NOT HANDLED ENEMY RESOURCES
3731
GET LIST OF ENEMY RESOURCES
3732
3733
MORE ENEMY RESOURCES ?
NO
3736
RETURN LIST OF NOT HANDLED ENEMY RESOURCES
3734
IS ENEMY RESOURCE BEING HANDLED ?
NO
ADD ENEMY RESOURCE TO THE LIST OF NOT HANDLED ENEMY RESOURCES
3735

FIG.37D

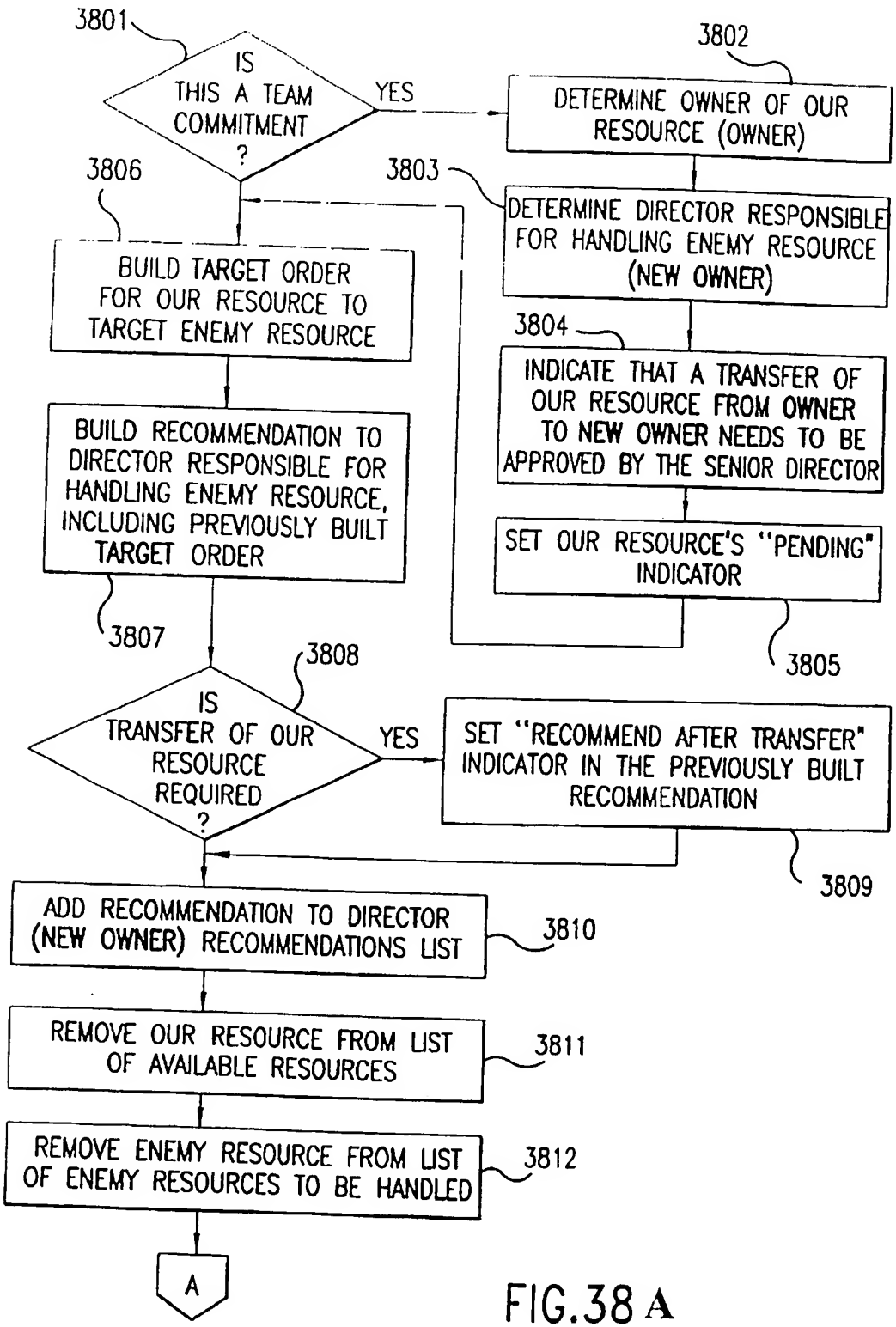

3801
IS THIS A TEAM COMMITMENT ?
YES
3802
DETERMINE OWNER OF OUR RESOURCE (OWNER)
3803
DETERMINE DIRECTOR RESPONSIBLE FOR HANDLING ENEMY RESOURCE (NEW OWNER)
3804
INDICATE THAT A TRANSFER OF OUR RESOURCE FROM OWNER TO NEW OWNER NEEDS TO BE APPROVED BY THE SENIOR DIRECTOR
SET OUR RESOURCE'S "PENDING" INDICATOR
3805
3806
BUILD TARGET ORDER FOR OUR RESOURCE TO TARGET ENEMY RESOURCE
BUILD RECOMMENDATION TO DIRECTOR RESPONSIBLE FOR HANDLING ENEMY RESOURCE, INCLUDING PREVIOUSLY BUILT TARGET ORDER
3807
3808
IS TRANSFER OF OUR RESOURCE REQUIRED ?
YES
SET "RECOMMEND AFTER TRANSFER" INDICATOR IN THE PREVIOUSLY BUILT RECOMMENDATION
3809
ADD RECOMMENDATION TO DIRECTOR (NEW OWNER) RECOMMENDATIONS LIST
3810
REMOVE OUR RESOURCE FROM LIST OF AVAILABLE RESOURCES
3811
REMOVE ENEMY RESOURCE FROM LIST OF ENEMY RESOURCES TO BE HANDLED
3812
A

FIG.38 A

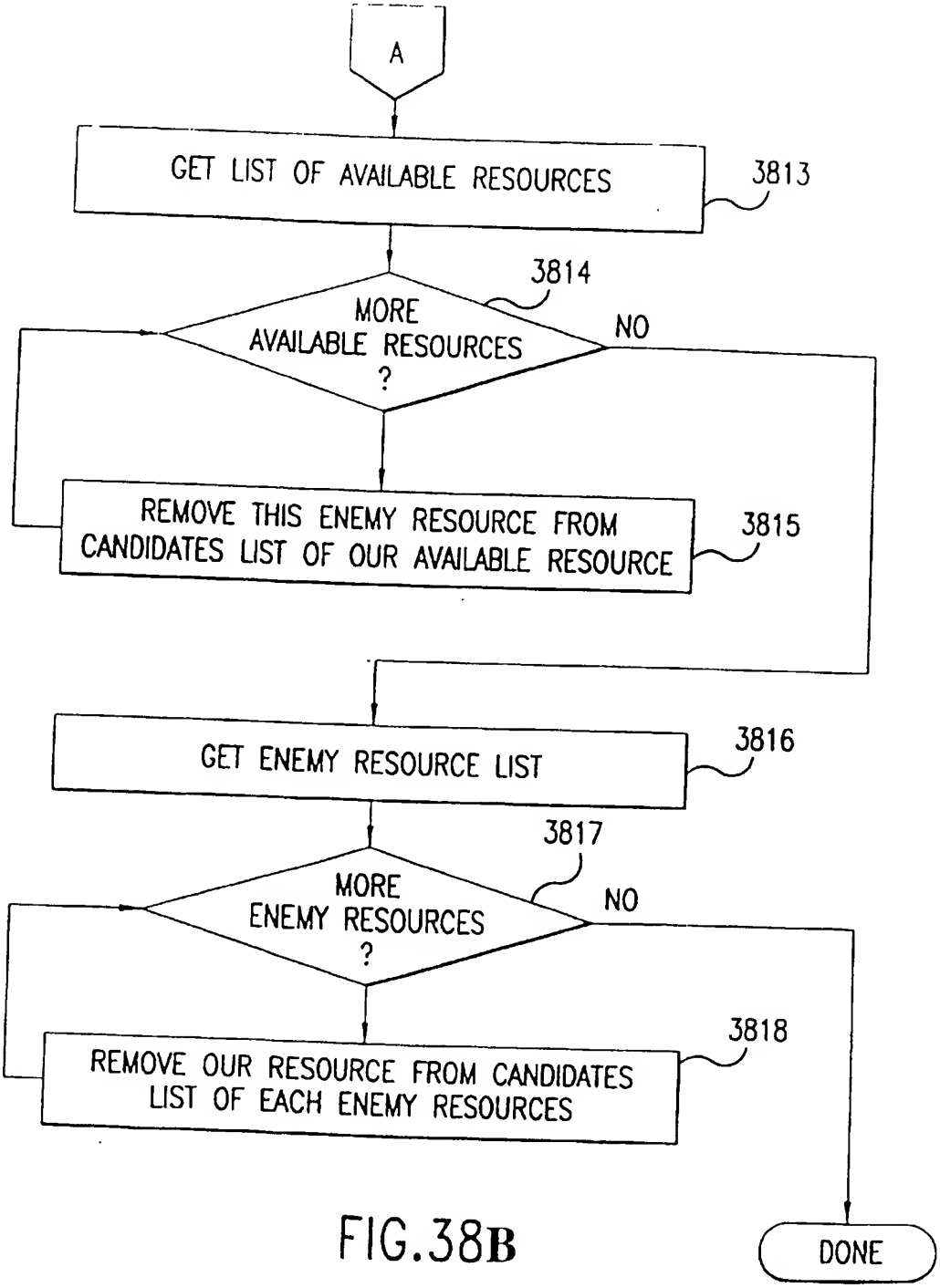

A
GET LIST OF AVAILABLE RESOURCES
3813
3814
MORE AVAILABLE RESOURCES ?
NO
REMOVE THIS ENEMY RESOURCE FROM CANDIDATES LIST OF OUR AVAILABLE RESOURCE
3815
GET ENEMY RESOURCE LIST
3816
3817
MORE ENEMY RESOURCES ?
NO
REMOVE OUR RESOURCE FROM CANDIDATES LIST OF EACH ENEMY RESOURCES
3818
DONE

FIG.38B

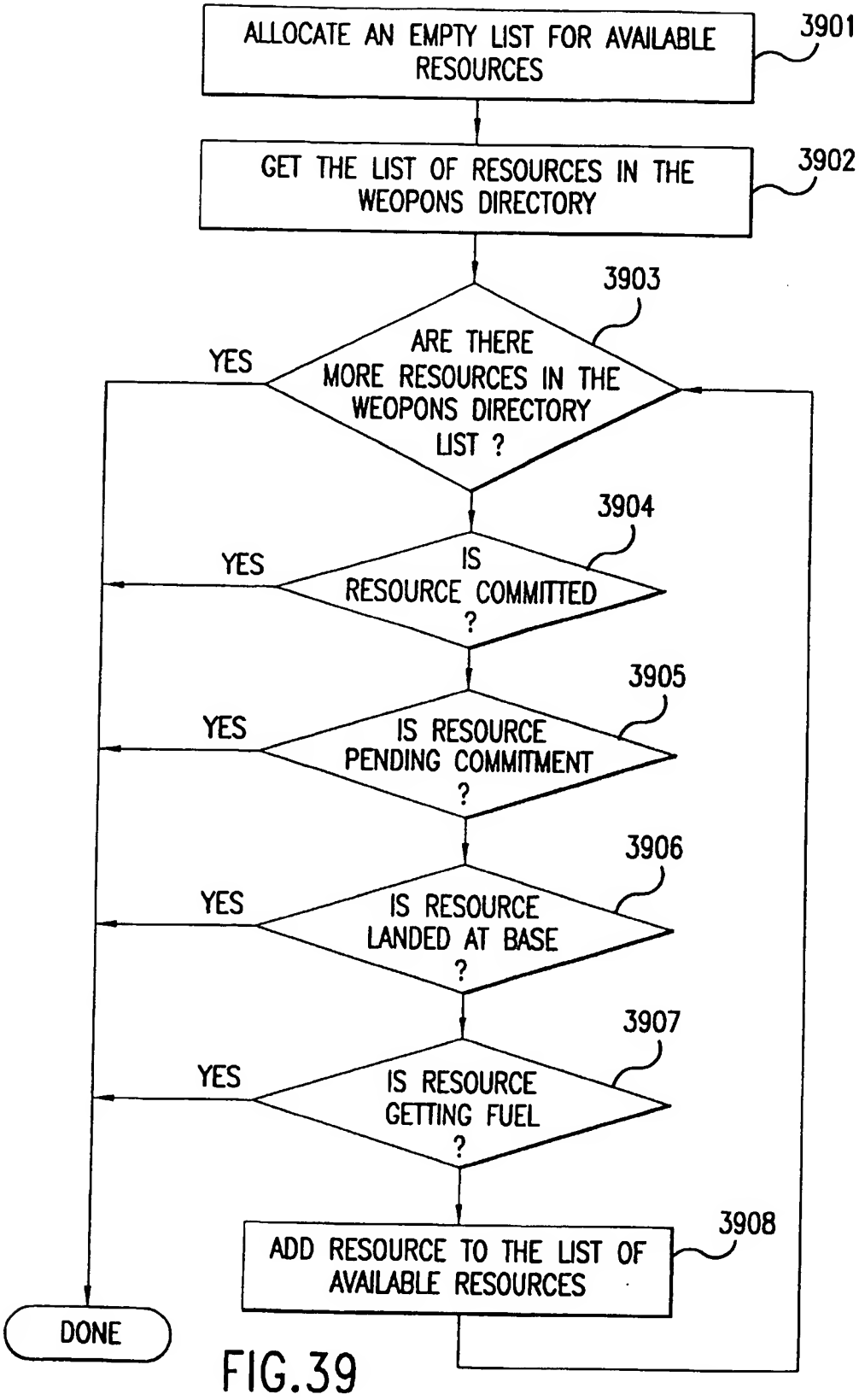

ALLOCATE AN EMPTY LIST FOR AVAILABLE RESOURCES
3901
GET THE LIST OF RESOURCES IN THE WEOPONS DIRECTORY
3902
3903
ARE THERE MORE RESOURCES IN THE WEOPONS DIRECTORY LIST ?
YES
3904
IS RESOURCE COMMITTED ?
YES
3905
IS RESOURCE PENDING COMMITMENT ?
YES
3906
IS RESOURCE LANDED AT BASE ?
YES
3907
IS RESOURCE GETTING FUEL ?
YES
3908
ADD RESOURCE TO THE LIST OF AVAILABLE RESOURCES
DONE

FIG.39

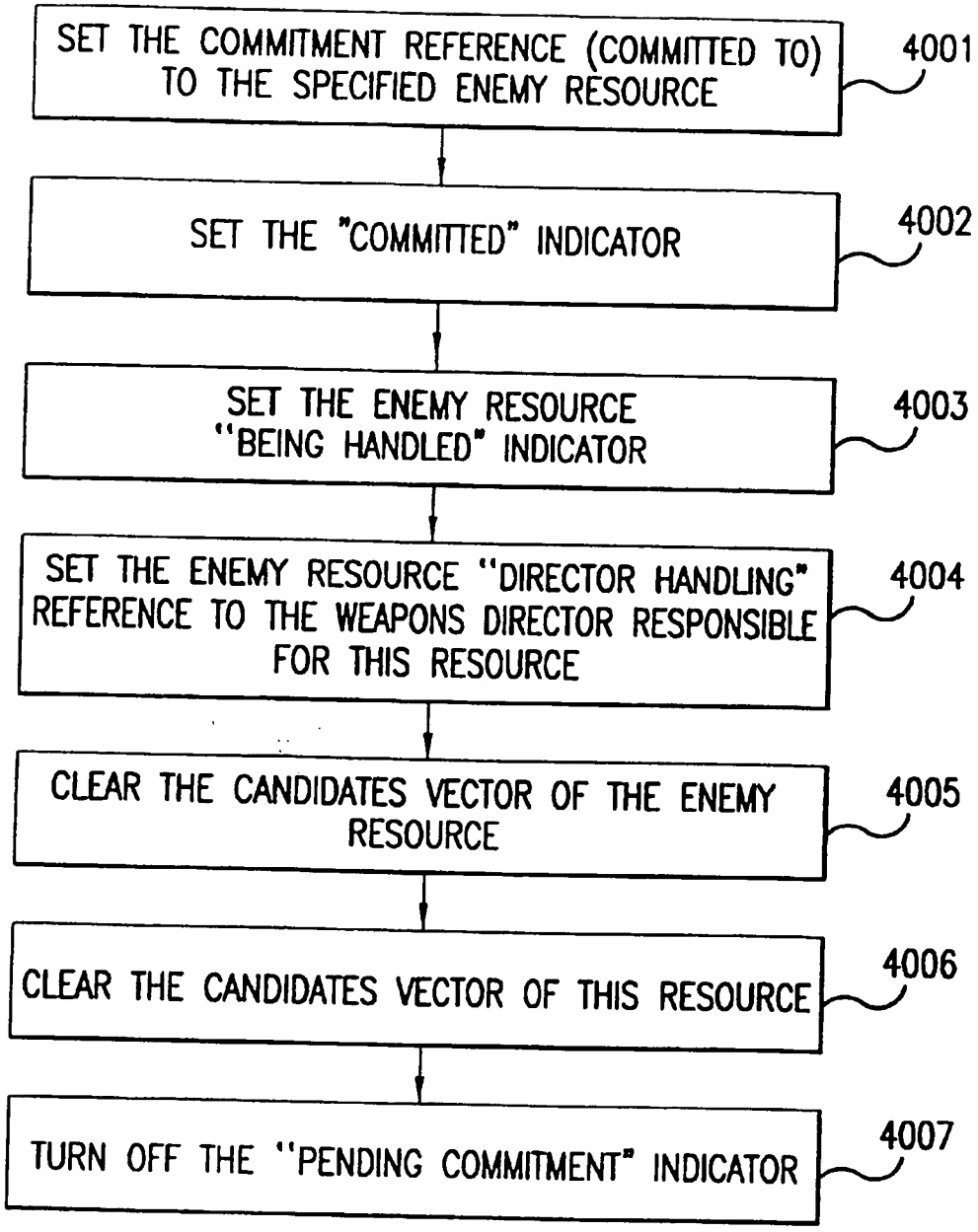

SET THE COMMITMENT REFERENCE (COMMITTED TO) TO THE SPECIFIED ENEMY RESOURCE
4001
SET THE "COMMITTED" INDICATOR
4002
SET THE ENEMY RESOURCE "BEING HANDLED" INDICATOR
4003
SET THE ENEMY RESOURCE "DIRECTOR HANDLING" REFERENCE TO THE WEAPONS DIRECTOR RESPONSIBLE FOR THIS RESOURCE
4004
CLEAR THE CANDIDATES VECTOR OF THE ENEMY RESOURCE
4005
CLEAR THE CANDIDATES VECTOR OF THIS RESOURCE
4006
TURN OFF THE "PENDING COMMITMENT" INDICATOR
4007

FIG.40

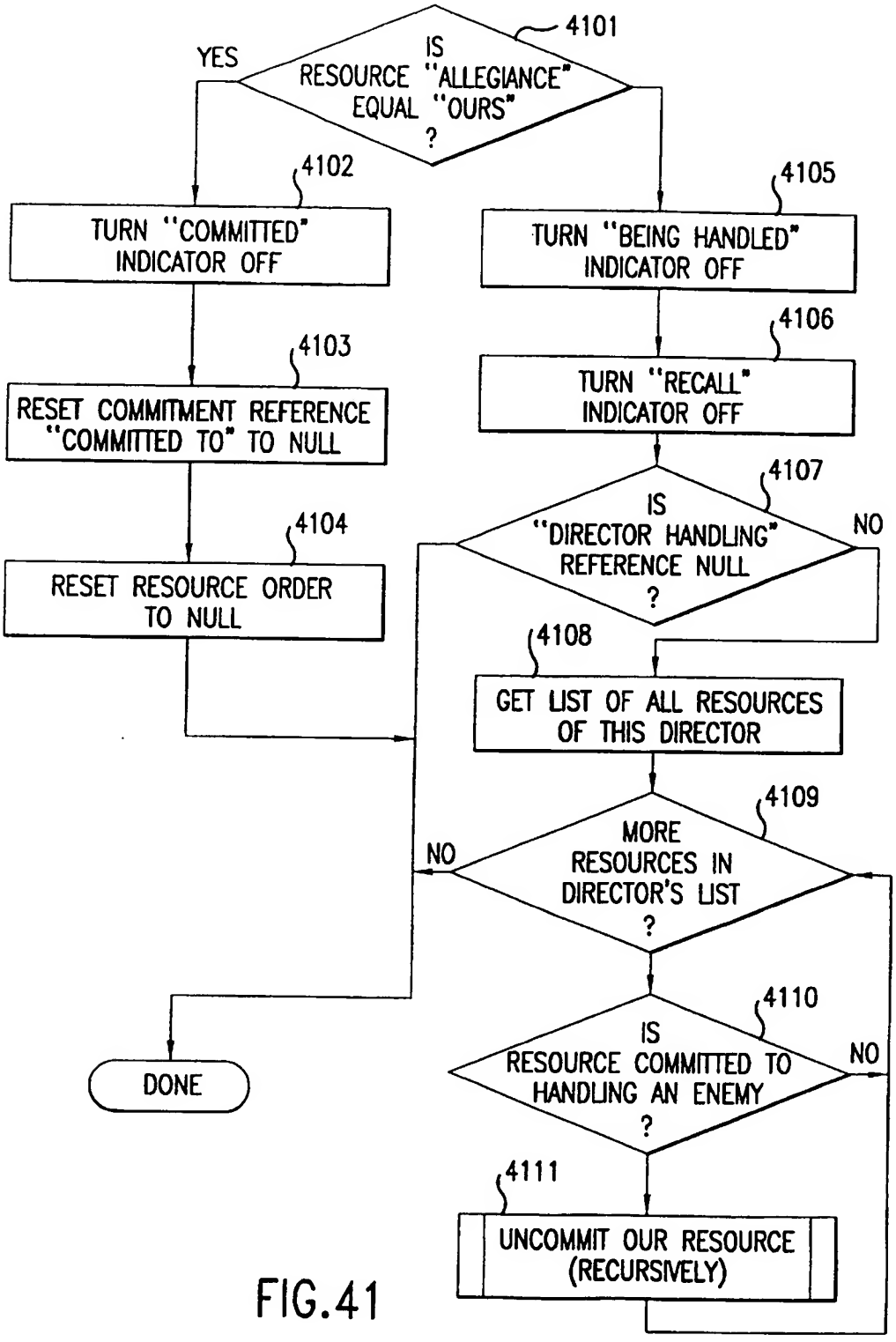

4101
IS RESOURCE "ALLEGIANCE" EQUAL "OURS" ?
YES
4102
TURN "COMMITTED" INDICATOR OFF
4103
RESET COMMITMENT REFERENCE "COMMITTED TO" TO NULL
4104
RESET RESOURCE ORDER TO NULL
4105
TURN "BEING HANDLED" INDICATOR OFF
4106
TURN "RECALL" INDICATOR OFF
4107
IS "DIRECTOR HANDLING" REFERENCE NULL ?
NO
4108
GET LIST OF ALL RESOURCES OF THIS DIRECTOR
4109
MORE RESOURCES IN DIRECTOR'S LIST ?
NO
4110
IS RESOURCE COMMITTED TO HANDLING AN ENEMY ?
NO
4111
UNCOMMIT OUR RESOURCE (RECURSIVELY)
DONE

FIG.41

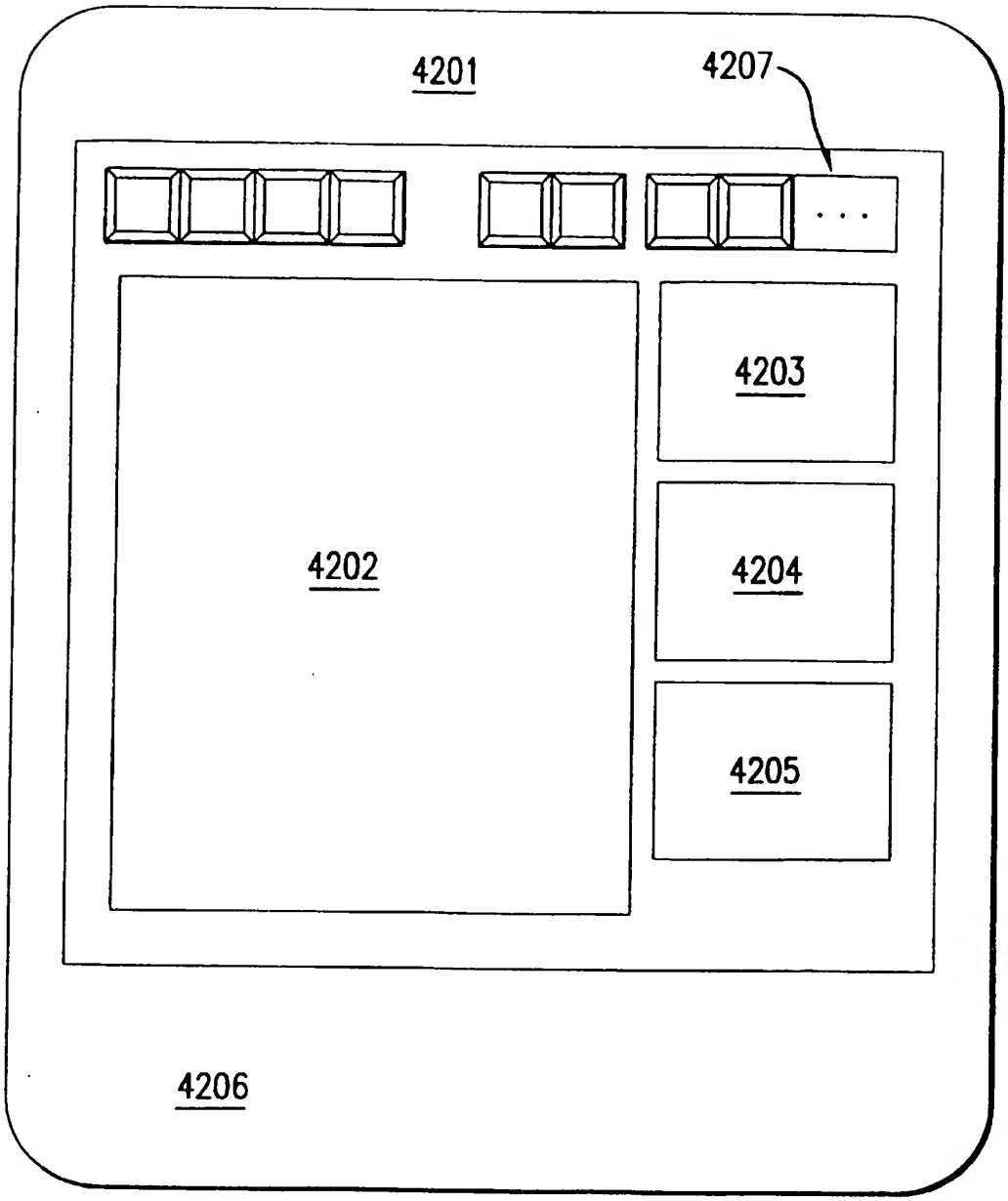
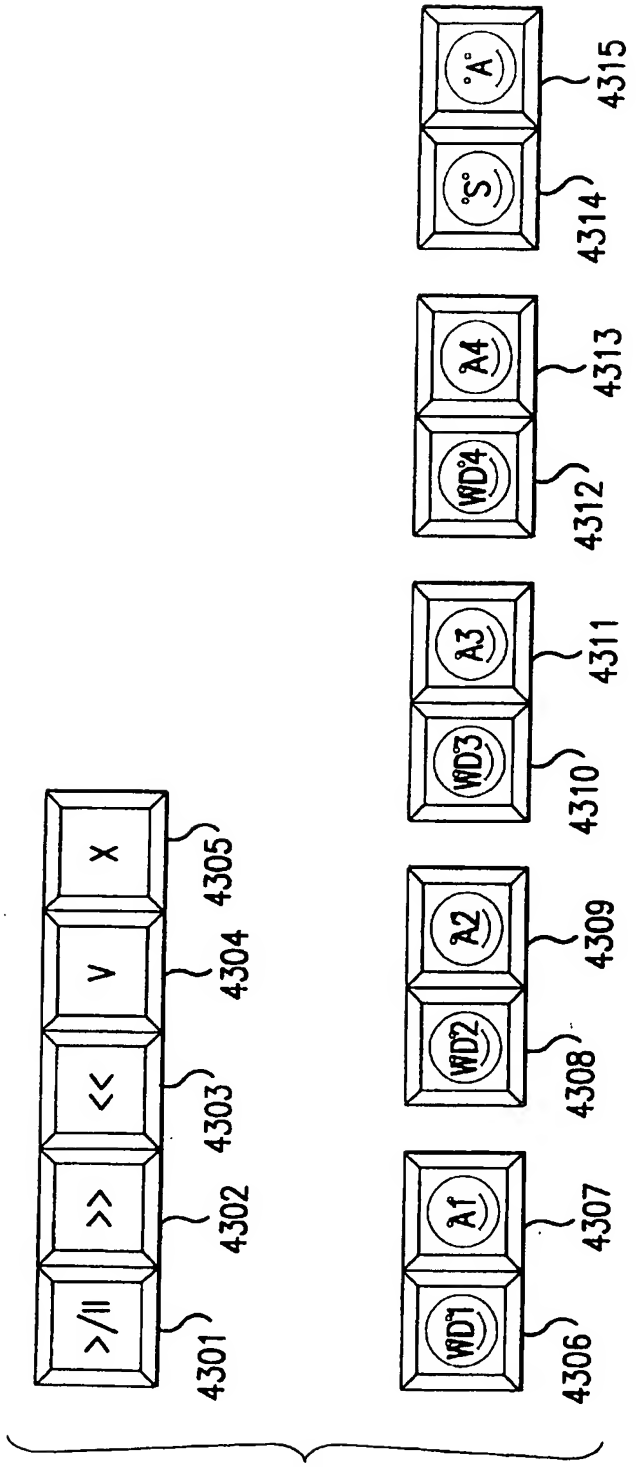


FIG.42


>/II
>>
<<
V
X
WD1
Af
WD2
A2
WD3
A3
WD4
A4
°S°
°A°
4301
4302
4303
4304
4305
4306
4307
4308
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4310
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4312
4313
4314
4315

FIG.43

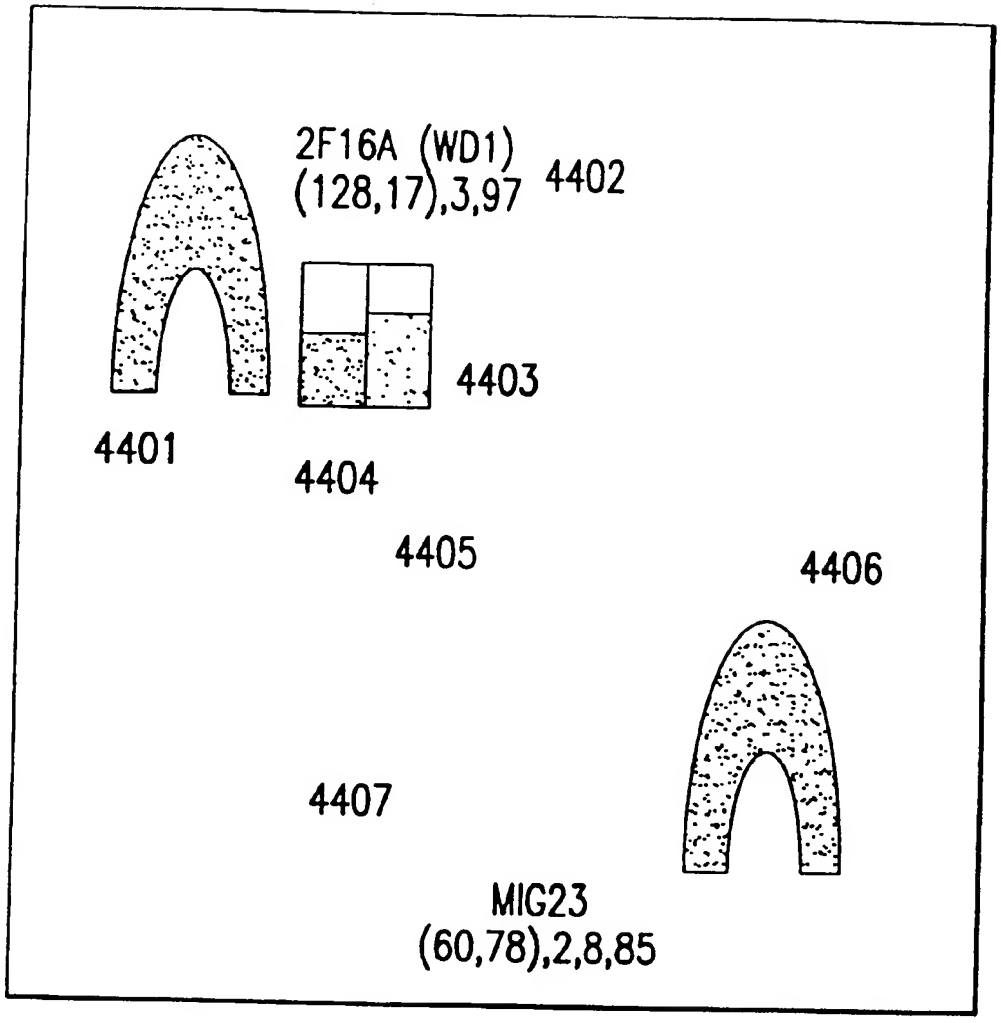
2F16A (WD1)
(128,17),3,97
4402
4403
4401
4404
4405
4406
4407
MIG23
(60,78),2,8,85

FIG.44

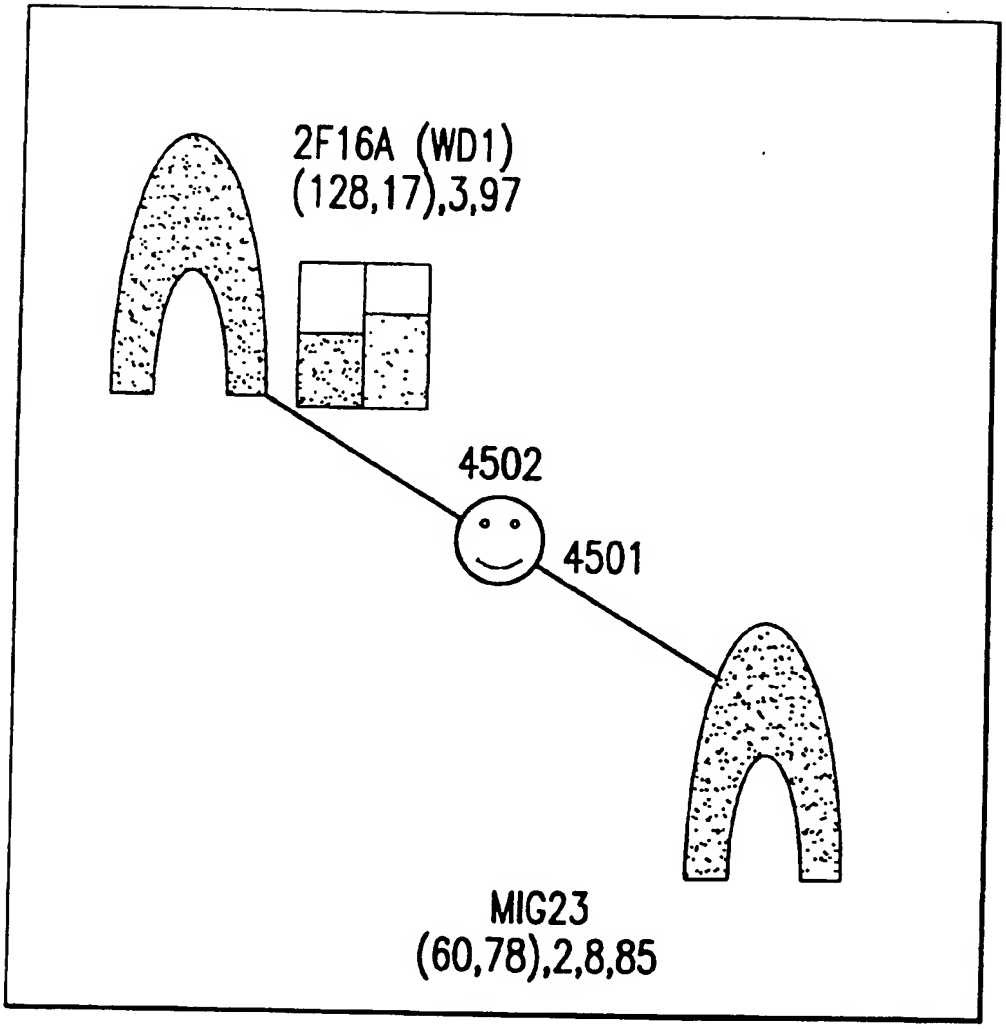

FIG.45

ACTION	RESULT
CLICK ON OUR MOVING RESOURCE AND DRAG TO THE SAME RESOURCE	SPLIT--IF OUR MOVING RESOURCE IS A GROUP, SPLIT THE GROUP (ADDITIONAL DISPLAY WILL PROVIDE A SELECTION OF MOVING RESOURCES TO BE SPLIT FORM THIS GROUP)
CLICK ON OUR MOVING RESOURCE AND DRAG TO OUR GROUP OF MOVING RESOURCES	JOIN--HAVE OUR MOVING RESOURCE JOIN OUR GROUP
CLICK ON OUR MOVING RESOURCE AND DRAG TO OUR TANKER	TANK--HAVE OUR MOVING RESOURCE PROCEED TO THIS TANKER FOR FUELING
CLICK ON OUR MOVING RESOURCE AND DRAG TO OUR BASE	RTB--HAVE OUR MOVING RESOURCE PROCEED TO AND LAND AT THIS BASE
CLICK ON OUR MOVING RESOURCE AND DRAG TO ENEMY RESOURCE	TARGET--HAVE OUR MOVING RESOURCE TARGET THE ENEMY RESOURCE
CLICK ON OUR MOVING RESOURCE AND DRAG TO A CAP AREA	CAP--HAVE OUR MOVING RESOURCE PERFORM COMBAT AIR PATROL IN THE SPECIFIED AREA
CLICK ON OUR MOVING RESOURCE AND DRAG TO A PARTICULAR POINT IN THE PRIMARY DISPLAY AREA NOT OCCUPIED BY ANY OTHER RESOURCE OR A CAP AREA	GO--HAVE OUR MOVING RESOURCE PROCEED TO THE SELECTED POINT

FIG. 46

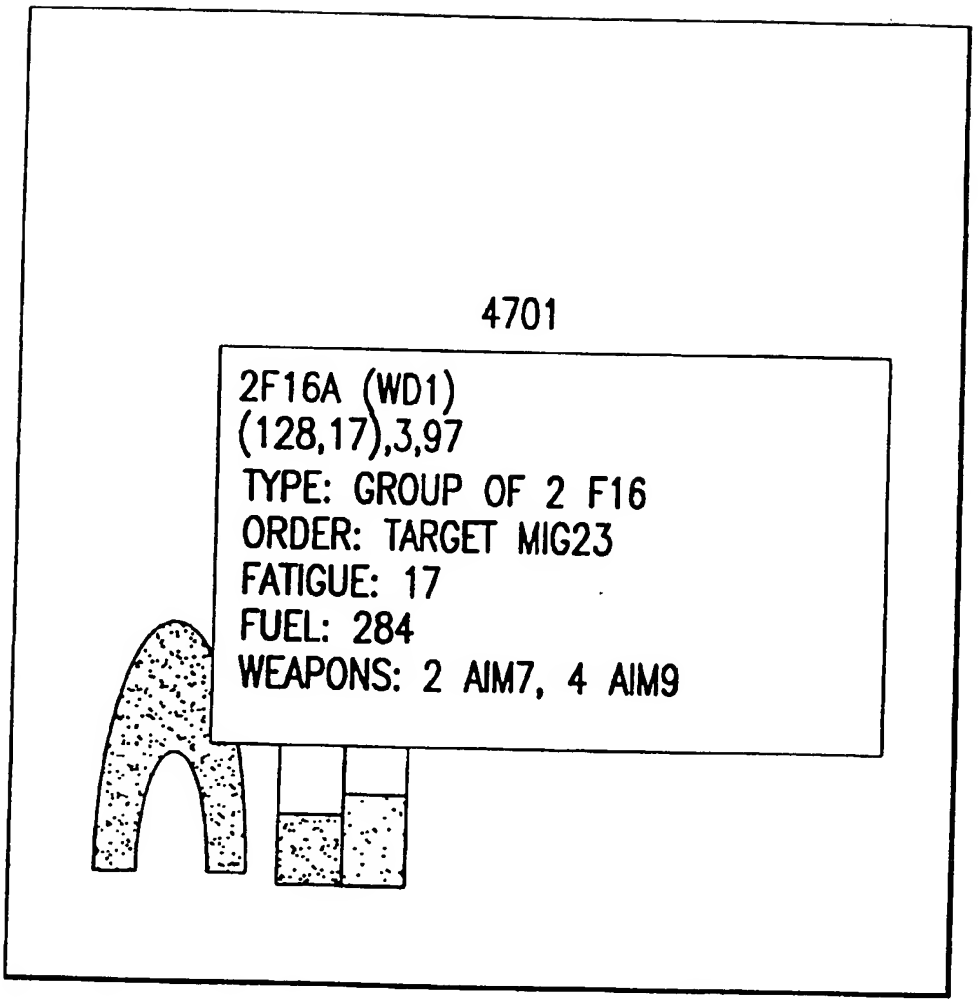
4701
2F16A (WD1)
(128,17),3,97
TYPE: GROUP OF 2 F16
ORDER: TARGET MIG23
FATIGUE: 17
FUEL: 284
WEAPONS: 2 AIM7, 4 AIM9

FIG.47

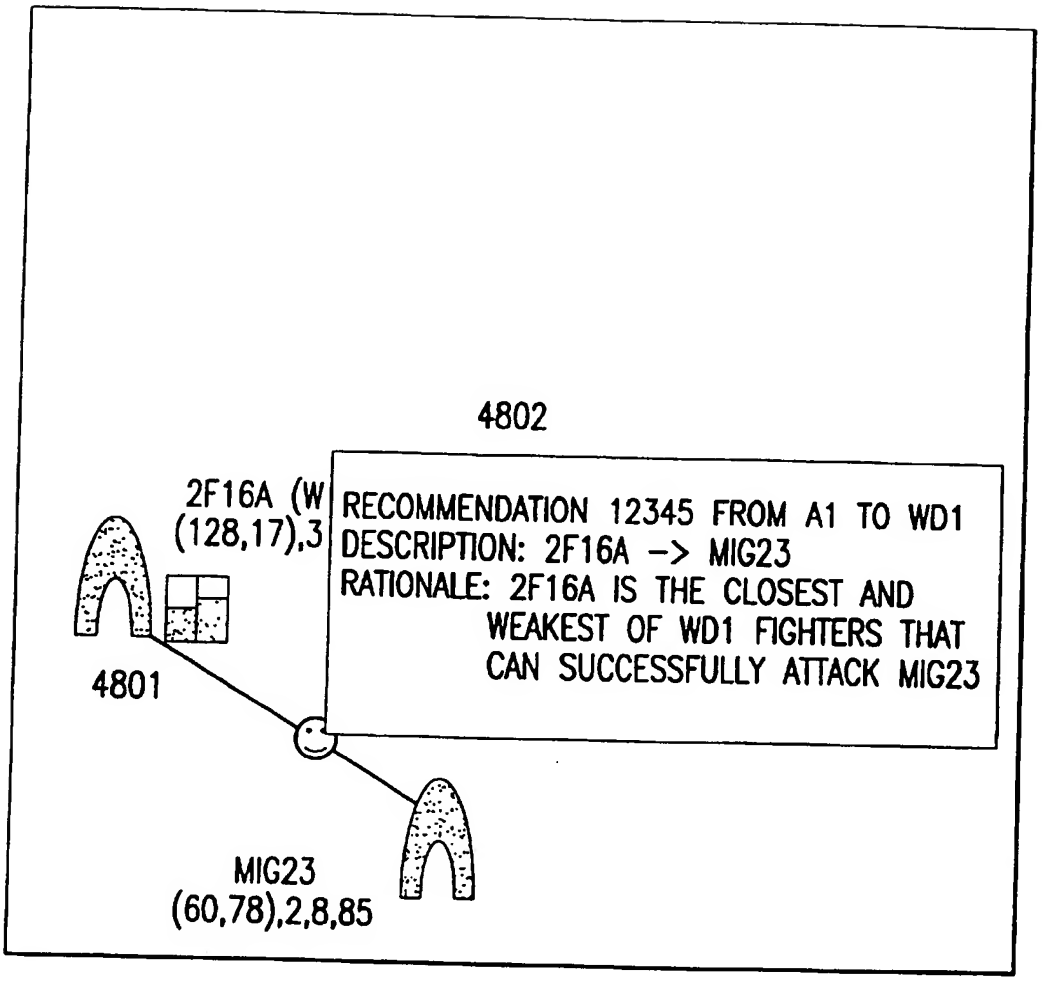
4802
2F16A (W
(128,17),3
RECOMMENDATION 12345 FROM A1 TO WD1
DESCRIPTION: 2F16A -> MIG23
RATIONALE: 2F16A IS THE CLOSEST AND
WEAKEST OF WD1 FIGHTERS THAT
CAN SUCCESSFULLY ATTACK MIG23
4801
MIG23
(60,78),2,8,85

FIG.48

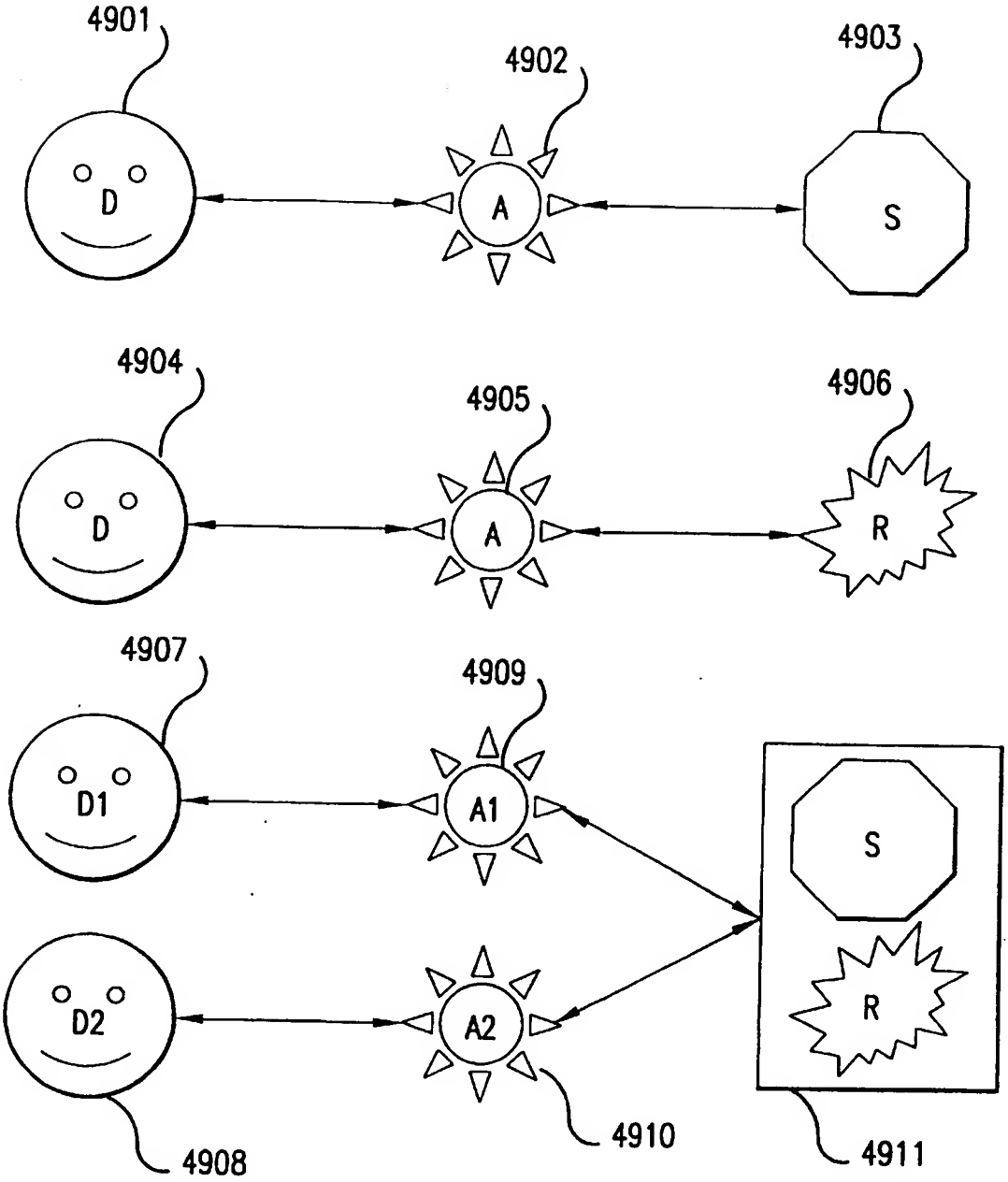
4901
4902
4903
D
A
S
4904
4905
4906
D
A
R
4907
4909
D1
A1
S
R
D2
A2
4908
4910
4911

FIG. 49

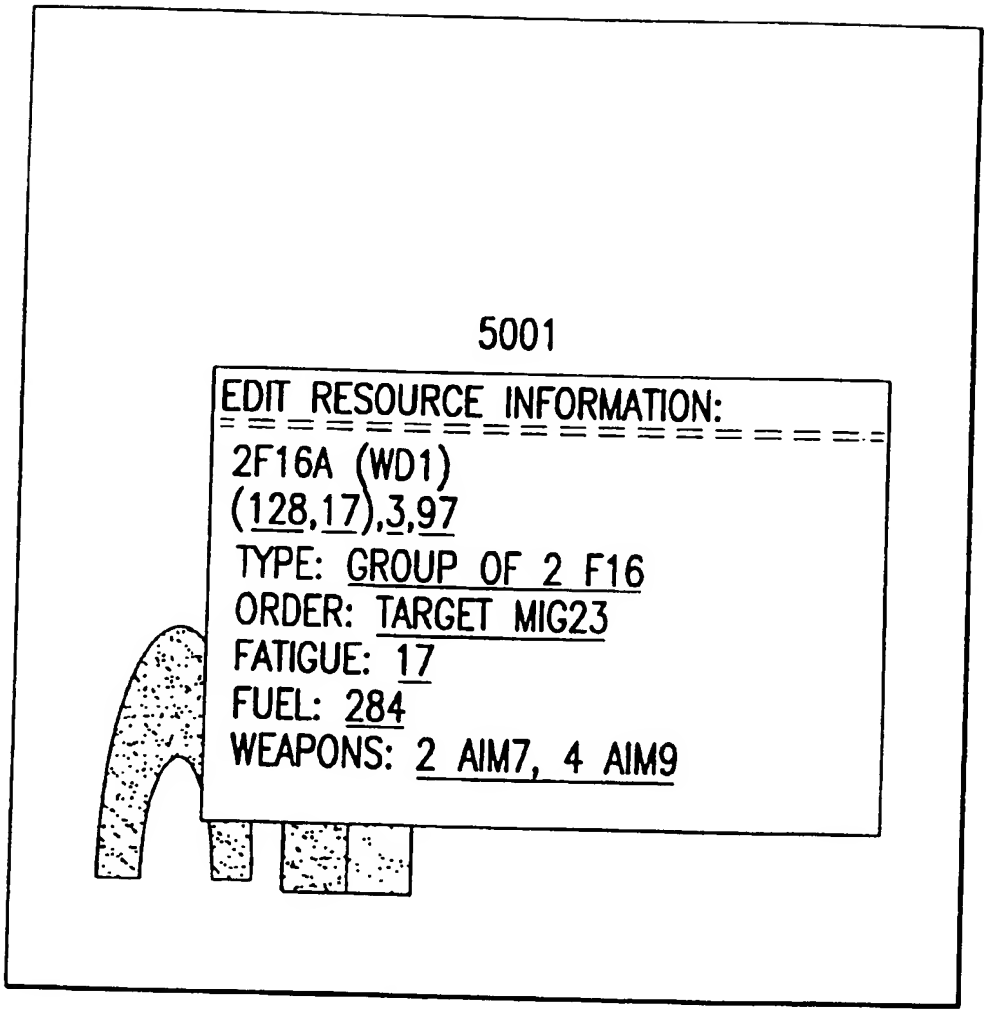
5001
EDIT RESOURCE INFORMATION:
2F16A (WD1)
(128,17),3,97
TYPE: GROUP OF 2 F16
ORDER: TARGET MIG23
FATIGUE: 17
FUEL: 284
WEAPONS: 2 AIM7, 4 AIM9

FIG.50

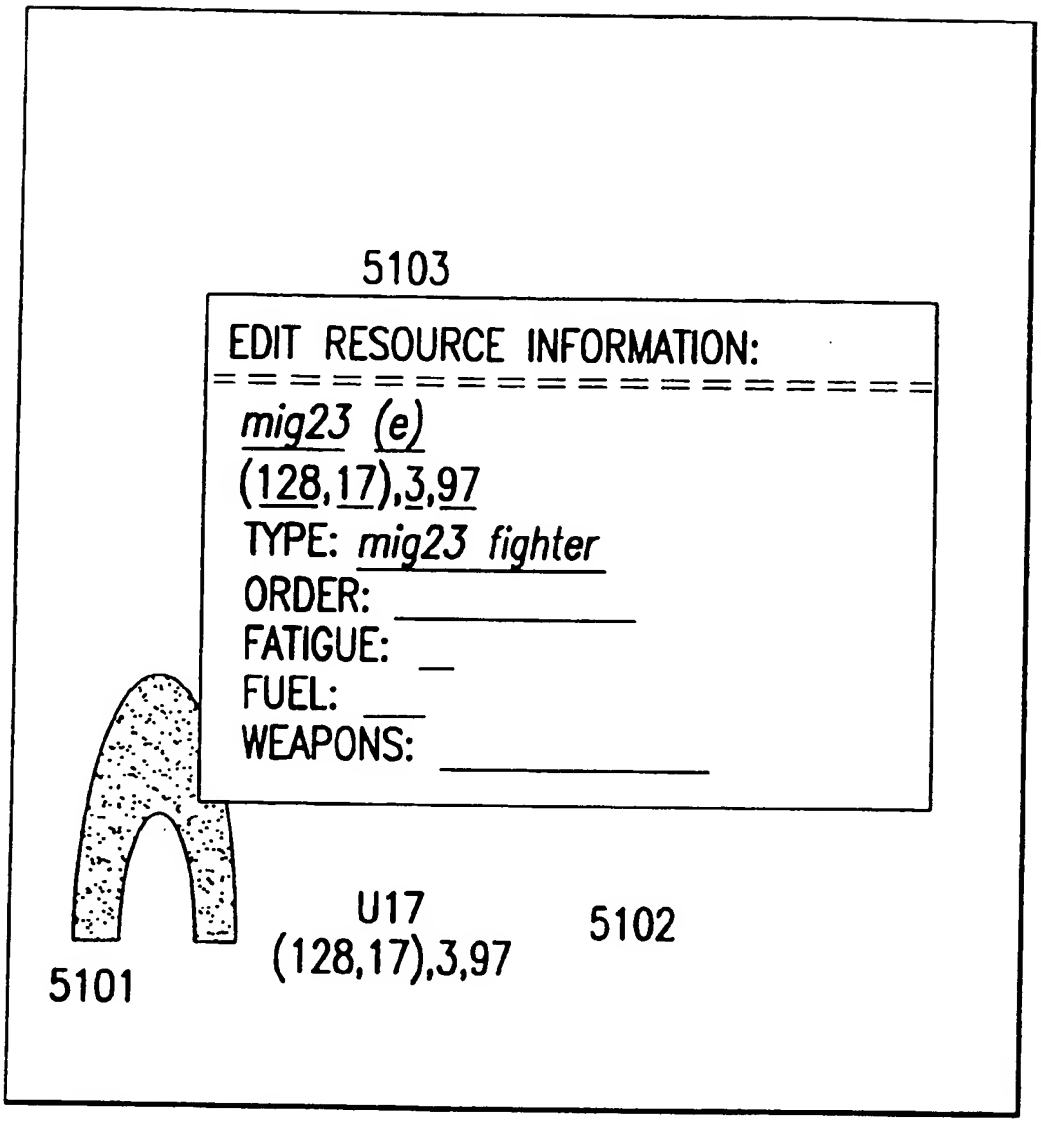
5103
EDIT RESOURCE INFORMATION:
mig23 (e)
(128,17),3,97
TYPE: mig23 fighter
ORDER:
FATIGUE:
FUEL:
WEAPONS:
U17
(128,17),3,97
5102
5101

FIG.51

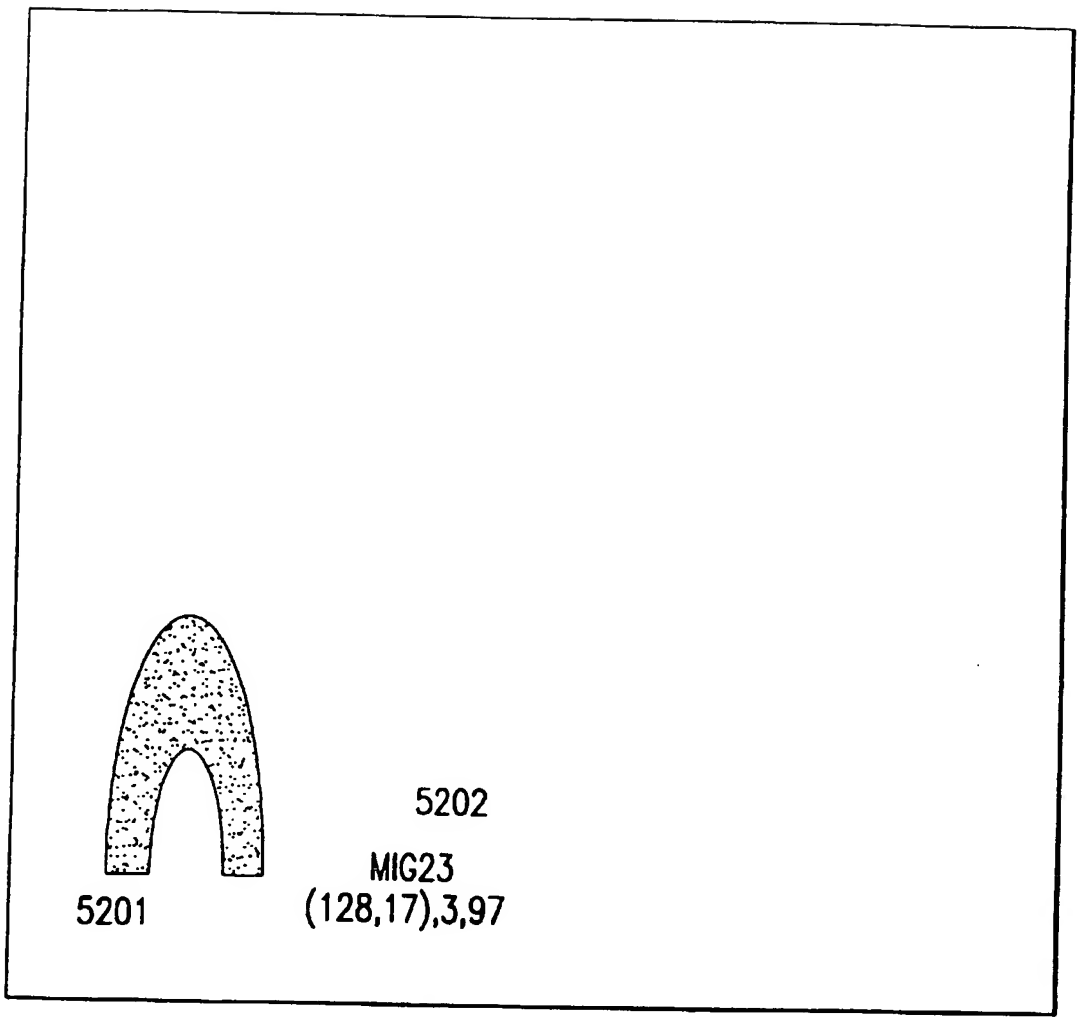

FIG.52

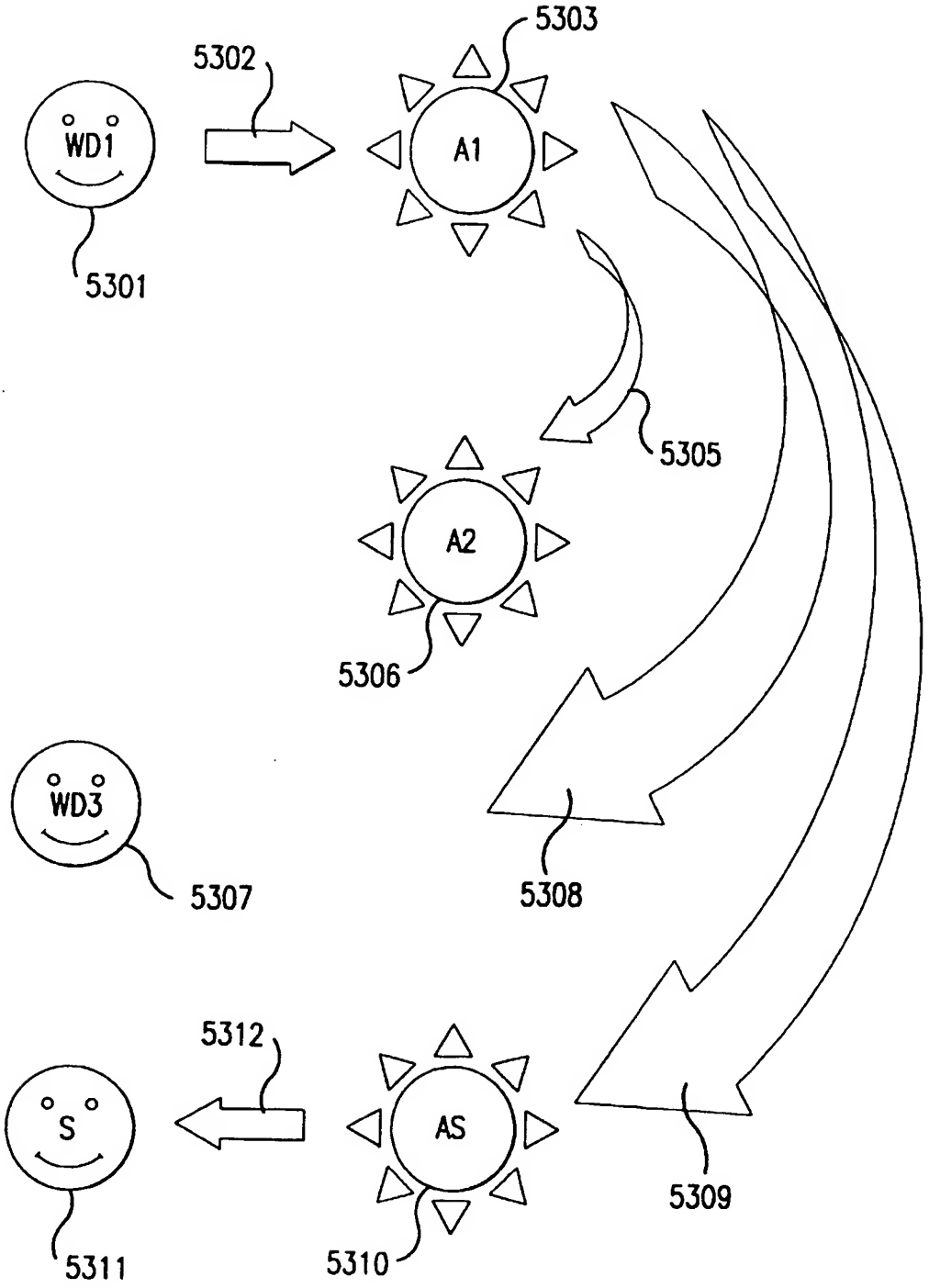
5303
5302
WD1
A1
5301
5305
A2
5306
WD3
5307
5308
5312
S
AS
5309
5311
5310

FIG.53

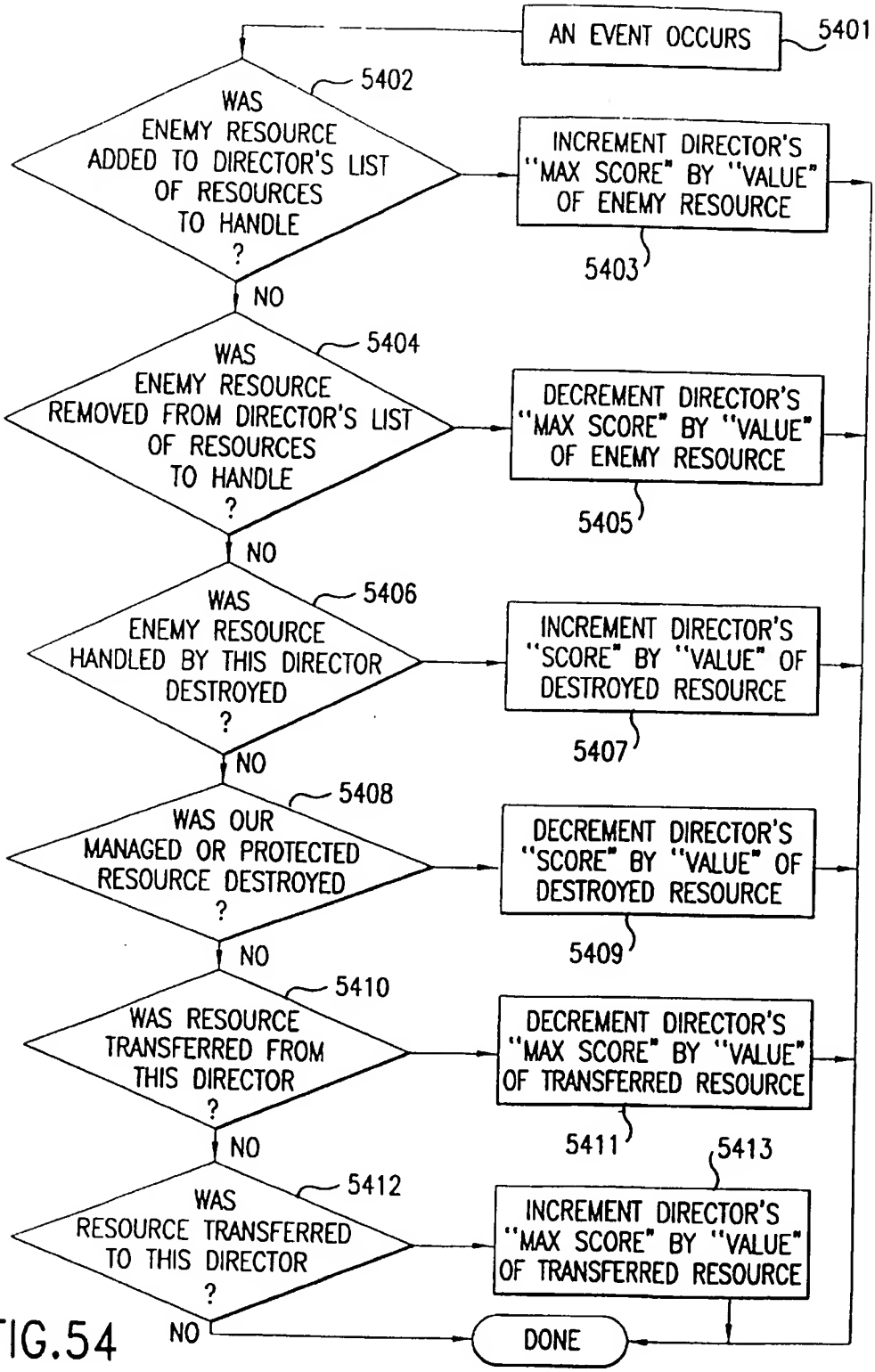
AN EVENT OCCURS
5401
WAS ENEMY RESOURCE ADDED TO DIRECTOR'S LIST OF RESOURCES TO HANDLE ?
5402
INCREMENT DIRECTOR'S "MAX SCORE" BY "VALUE" OF ENEMY RESOURCE
5403
NO
WAS ENEMY RESOURCE REMOVED FROM DIRECTOR'S LIST OF RESOURCES TO HANDLE ?
5404
DECREMENT DIRECTOR'S "MAX SCORE" BY "VALUE" OF ENEMY RESOURCE
5405
NO
WAS ENEMY RESOURCE HANDLED BY THIS DIRECTOR DESTROYED ?
5406
INCREMENT DIRECTOR'S "SCORE" BY "VALUE" OF DESTROYED RESOURCE
5407
NO
WAS OUR MANAGED OR PROTECTED RESOURCE DESTROYED ?
5408
DECREMENT DIRECTOR'S "SCORE" BY "VALUE" OF DESTROYED RESOURCE
5409
NO
WAS RESOURCE TRANSFERRED FROM THIS DIRECTOR ?
5410
DECREMENT DIRECTOR'S "MAX SCORE" BY "VALUE" OF TRANSFERRED RESOURCE
5411
NO
WAS RESOURCE TRANSFERRED TO THIS DIRECTOR ?
5412
INCREMENT DIRECTOR'S "MAX SCORE" BY "VALUE" OF TRANSFERRED RESOURCE
5413
NO
DONE

FIG.54

RECOMMENDATION TYPE	ACCEPTED COUNT	CURRENT RESOURCE ORDER (ACC.)	RESOURCE LOCATION (ACC.)	NOT ACCEPTED COUNT	CURRENT RESOURCE ORDER (NOT ACC.)	RESOURCE LOCATION (NOT ACC.)
TARGET	17	5– CAP 12– GO	5– CAP1	5	5– CAP	5– CAP2
RTB	5	5– CAP	5– CAP1	4	4– CAP	4– CAP2
TANK	11	4– CAP 7–– GO	4– CAP1	0		
JOIN	2	2–GO		0		
SPLIT	4	4–GO		0		
GO	0			4	4–– TANK	
CAP	7	7–GO		1	1–– TARGET	

FIG. 55